

(19) 日本国特許庁 (JP)

(12) 公開特許公報 (A)

(11)特許出願公開番号  
特開2001-253580  
(P2001-253580A)

(43)公開日 平成13年9月18日(2001.9.18)

(51) Int.Cl.  
B 65 H 3/52

識別記号  
310

F I  
B 65 H 3/52

テーマコード(参考)  
3F343

審査請求 未請求 請求項の数14 O.L. (全 15 頁)

(21) 出願番号 特願2000-69338(P2000-69338)

(71)出願人 000001007  
キヤノン株式会社  
東京都大田区下丸子3丁目30番2号

(72)発明者 井上 隆吉  
東京都大田区下丸子3丁目30番2号 キヤ  
ノン株式会社内

(72)発明者 松尾 佳広  
東京都大田区下丸子3丁目30番2号 キヤ  
ノン株式会社内

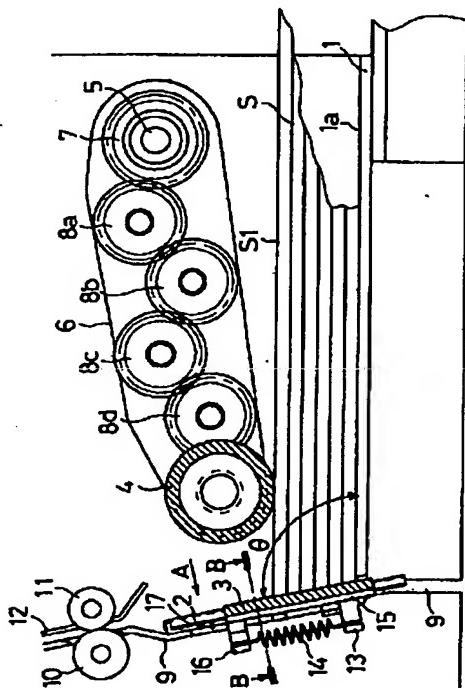
(74)代理人 100082337  
弁理士 近島 一夫 (外1名)

(54) 【発明の名称】 紙給装置及びこれを備えた画像形成装置

(57) 【要約】

**【課題】** シートを確実に給紙することができると共に、重送防止効果の高い給紙装置及びこれを備えた画像形成装置を提供する。

【解決手段】 給紙の際、シート収納手段1のシート積載面1aに対して鈍角を成す角度θに配置される第1斜面2と、第1斜面2と比較して高い摩擦係数を示す部材により構成される第2斜面3との共働により、第1斜面2に沿って上方移動する、シート収納手段1に積載収納されたシートSのうちの最上位のシートS1を、他のシートから分離する。さらに、第2斜面3を第1斜面2に沿って上下方向に移動可能とする一方、給紙の際には、第2斜面3を最上位のシートS1の第1斜面2に沿った移動に伴って上方移動させ、最上位のシートS1を分離した後は、下方移動させて移動前の位置に戻すようにする。



特開2001-253580  
(P2001-253580A)

(2)

2

## 【特許請求の範囲】

【請求項 1】 シート収納手段に積載収納されたシートを給紙手段により送り出して分離斜面により1枚ずつ分離給送する給紙装置において、

前記分離斜面を、第1分離斜面と、該第1分離斜面と比較して高い摩擦係数を有し、前記第1分離斜面に沿って且つ前記給紙手段により送り出されたシートの移動方向に移動可能に設けられた第2分離斜面とから構成し、前記第2分離斜面を、前記シート収納手段から送り出されたシートから加えられる力によって初期位置から前記第1分離斜面に沿ってシートの移動方向下流側に移動するように構成したことを特徴とする給紙装置。

【請求項 2】 前記第2分離斜面は、前記シート収納手段から送り出されたシートから所定の大きさよりも大きな力が加えられたときに前記初期位置から前記第1分離斜面に沿ってシートの移動方向の下流側に移動し、シートから加えられる力が所定の大きさよりも小さくなると前記初期位置に戻るよう構成したことを特徴とする請求項1記載の給紙装置。

【請求項 3】 前記第2分離斜面を保持する斜面保持部材を前記第1分離斜面に沿ったシートの移動方向に平行に移動可能に支持するガイド手段と、前記斜面保持部材を前記第1分離斜面に沿ったシートの移動方向の上流側の前記初期位置に向けて付勢する弾性部材とを有することを特徴とする請求項2記載の給紙装置。

【請求項 4】 前記第2分離斜面を前記第1分離斜面よりも収納されているシート側に突出させるか、又は、前記第2分離斜面と前記第1分離斜面とを同一面とすることを特徴とする請求項1乃至3のいずれかに記載の給紙装置。

【請求項 5】 前記給紙手段に対向する位置に前記第2分離斜面を配置し、該第2分離斜面を前記第1分離斜面よりも収納されているシートから離れた位置で移動可能に設けたことを特徴とする請求項1乃至3のいずれか1項に記載の給紙装置。

【請求項 6】 前記第1分離斜面に沿ったシートの移動方向下流側への前記第2分離斜面の移動に伴って該第2分離斜面を、収納されているシートから離れる側に移動するように構成したことを特徴とする請求項1又は2に記載の給紙装置。

【請求項 7】 前記第2分離斜面を保持する斜面保持部材と、前記第2分離斜面を前記斜面保持部材を介して移動可能に保持するベース部材と、

前記ベース部材に設けられ、前記斜面保持部材の移動を案内する軌道面と、を備え、

前記軌道面を前記第1分離斜面よりも傾斜させると共に、前記保持部材を略楔形状とすることにより、前記第1分離斜面に沿ったシートの移動方向下流側への前記第2分離斜面の移動に伴って該第2分離斜面を直線的に收

納されているシートから離れるように移動させることを特徴とする請求項6記載の給紙装置。

【請求項 8】 前記第1分離斜面に沿ったシートの移動方向下流側への前記第2分離斜面の移動に伴って該第2分離斜面を非直線的に収納されているシートから離れるように構成したことを特徴とする請求項6記載の給紙装置。

【請求項 9】 前記第2分離斜面を保持する斜面保持部材と、

前記第2分離斜面を前記斜面保持部材を介して移動可能に保持するベース部材と、

前記ベース部材に設けられ、前記斜面保持部材に設けたボスが摺動可能に保合する円弧状に形成された長穴と、を備え、

前記第1分離斜面に沿ったシートの移動方向下流側への前記第2分離斜面の移動に伴って該第2分離斜面を非直線的に収納されているシートから離れるようにしたことを特徴とする請求項8記載の給紙装置。

【請求項 10】 初期位置では前記第2分離斜面を前記第1分離斜面より収納されているシート側に突出するよう設け、前記第2分離斜面の移動により該第2分離斜面を突出した位置から前記第1分離斜面よりも収納されているシートから離れた側に引っ込んだ位置まで前記第2分離斜面が移動可能であることを特徴とする請求項6乃至9のいずれか1項に記載の給紙装置。

【請求項 11】 前記第1分離斜面及び前記第2分離斜面が配置されていない個所に前記給紙手段により送り出されたシートを案内するガイド部材を設け、該ガイド部材を、前記シート収納部のシート積載面に対して前記第1分離斜面より大きい鈍角をなす第1ガイド面と、該第1のガイド面と鈍角をなす第2ガイド面とを有することを特徴とする請求項1乃至10のいずれか1項に記載の給紙装置。

【請求項 12】 前記給紙手段と前記第1及び第2分離斜面との間に、前記給紙手段により送り出されたシートを前記積載されているシート側に押圧するための押圧手段を設けたことを特徴とする請求項1乃至10のいずれか1項に記載の給紙装置。

【請求項 13】 前記シート収納手段から送り出されるシートをシートの幅方向におけるセンターを基準として送り出されるように構成されており、前記第2分離斜面をシートの前記センターに対応する部分に配置し、前記第1分離斜面を前記第2分離斜面の両側に配置したことを特徴とする請求項1乃至10のいずれか1項に記載の給紙装置。

【請求項 14】 前記請求項1乃至13のいずれか1項に記載された給紙装置と、該給紙装置から給送されたシートに画像を形成する画像形成部と、を備えたことを特徴とする画像形成装置。

【発明の詳細な説明】

特開2001-253580  
(P2001-253580A)

(3)

3

## 【0001】

【発明の属する技術分野】本発明は、給紙装置及びこれを備えた画像形成装置に関し、特に斜面分離方式によりシートを分離するものに関する。

## 【0002】

【従来の技術】従来の画像形成装置においては、画像形成部にシートを1枚ずつ分離して給紙する給紙装置を備えたものがある。そして、このような給紙装置として、斜面上に、ブラン等の摩擦係数の高い部材を貼り付ける事により、分離性能を高めた斜面分離式のものがあり、このような給紙装置は、例えば特開平11-11719号公報に示されているような構成のものがある。

【0003】ここで、図22は、このような斜面分離を採用した給紙装置を説明する図であり、同図において、101はシート(束)Sを収納する給紙トレイ、104は図示しない歯車を一体に保持した給紙ローラ、105は駆動軸、106は給紙ローラ104を回転自在に保持し、かつ、駆動軸105に対して回転自在に保持されている給紙ローラアームである。

【0004】そして、駆動軸105の駆動は、この駆動軸105に固定された駆動ギヤ107、給紙ローラアーム106に保持されたアイドラギヤ108a、108b、108c、108dを介して給紙ローラ103に伝達されるようになっている。

【0005】一方、同図において、102は給紙トレイ101の、収納されたシート(束)Sの先端と当接する面に配置された第1分離斜面であり、この第1分離斜面102は積載されたシート(束)Sに対しθの角度(鈍角)を成すように配置されている。また、103は第1分離斜面102と平行に固定され、かつシート(束)Sの先端に当接する第2分離斜面であり、この第2分離斜面103は第1分離斜面102よりも高い摩擦係数をもつ部材で構成されている。

【0006】ここで、この第2分離斜面103は、図2のA方向矢視図である図23に示すように、左右の第1分離斜面102a、102bの間に挟まれた形で配置されている。なお、同図において、110は搬送ローラ、113は搬送ローラ110の軸110aの一端に固定された搬送ギヤであり、この搬送ギヤ113を介して搬送ローラ110には図示しない駆動源からの駆動が伝達されるようになっている。

【0007】また、図22において、109は第1及び第2分離斜面102、103、給紙トレイ101等を支持し、かつ第1分離斜面102及び第2分離斜面103が配置されていない範囲のシートガイド部材となるベースブロックである。さらに、111は図示しない付勢手段により搬送ローラ110と所定圧で接触している回転自在な搬送コロであり、この搬送コロ111と搬送ローラ110により、シートSが上面搬送ガイド112により上面をガイドされながら不図示の画像形成部に搬送

10

30

40

50

4

されていくようになっている。

【0008】一方、図24はこのような構成の給紙装置を備えた画像形成装置の概略を示した図であり、同図において、117は画像形成部である。なお、この画像形成部117は、感光ドラム118、感光ドラム118と不図示の画像現像手段を一体に保持したトナーカートリッジ119、感光ドラム118上に潜像を形成するレーザースキャナ120、感光ドラム118上に形成された潜像をトナーカートリッジ119内で現像して形成されたトナー画像をシートに転写する転写ローラ121を備えている。

【0009】また同図において、122はトナー画像をシートに定着する定着器、123は定着後のシートを搬送する第1排紙ローラ対、124は第1排紙ローラ対123の下流に設けられ、第1排紙ローラ対123から搬送されたシートを画像形成装置外に排出する第2排紙ローラ対、125は排出されたシートSを積載する排紙トレイである。

【0010】次に、このように構成された画像形成装置における画像形成動作について説明する。

【0011】シートに画像を形成する際は、まず図示しない駆動機構より駆動を受けた駆動軸105が回転し、この駆動軸105の回転は、給紙ローラアーム106内のアイドラギヤ108a、108b、108c、108d(図22参照)を介して給紙ローラ104に伝達され、これにより給紙ローラ104は回転を始める。

【0012】このとき給紙ローラ104は給紙トレイ101に収納されたシート(束)Sの中の最上位に位置するシートS1の上面に圧接しているため、給紙ローラ104が回転を開始すると、最上位のシートS1には給紙ローラ104との摩擦力による給送力が作用する。

【0013】そして、このような給送力が作用すると、シートS1は第1分離斜面102及び第2分離斜面103に圧接し、第1及び第2分離斜面102、103からの反力を受ける。ここで、このような反力を受けると、シートS1の先端が曲げられるようになり、シートS1は、その後の給紙ローラ104の回転により、第1及び第2分離斜面102、103上を先端が突き当たったまま、先端部が上向きに曲げられた状態で進行することとなる。

【0014】次に、このように進行したシートS1はやがて第1分離斜面102、第2分離斜面103によりさばかれて他のシートから分離され、この後、搬送ローラ110の回転により搬送され、現像ドラム118と転写ローラ121とのニップに送り込まれる。

【0015】ここで、このとき現像ドラム118上には、スキャナ120によって現像ドラム118上に書き込まれた潜像をトナーカートリッジ119内で現像することによりトナー画像が形成されている。この結果、現像ドラム118と転写ローラ121とのニップに送り込

特開2001-253580  
(P2001-253580A)

(4)

5

まれたシートS1には、転写ローラ121によりトナー画像が転写される。

【0016】次に、このようにトナー画像が転写されたシートS1は定着器122に搬送され、この定着器122でトナー画像はシートS1に定着される。この後、トナー画像が定着されたシートS1は、第1排紙ローラ対123及び第2排紙ローラ対124により画像形成装置外へ排出され、排紙トレイ125上に積載される。

【0017】ところで、シートS1を分離する際、通常は第1分離斜面102のみで最上位のシートS1のみを他のシートから分離することが可能である。しかし、例えば薄紙等のシートを搬送する場合、給紙力が加わったとき、シートS1は第1分離斜面102に張り付き気味となる。そこで、このようなシートを確実に分離することができるよう既述した図23に示すように第1分離斜面102の他に高摩擦係数を有する第2分離斜面103を設け、この第2分離斜面103によりシート先端の移動に抵抗する力を他のシートの先端に加え、張り付き気味のシートの分離を行うようにしている。

#### 【0.018】

【発明が解決しようとする課題】ところが、このような従来の給紙装置においては、高摩擦係数を有する第2分離斜面103が第1分離斜面102と平行に固定されていることから、シートが移動可能であるのは、第2分離斜面103の表層もしくは全体の弹性変形分のみであった事から、以下のような欠点があった。

【0019】即ち、弹性変形を起こすために必要な力が大きいために、シートの第2分離斜面に当接する部分にのみ大きなブレーキ力が働き、薄紙などではその部分のみが変形を起こす事があった。

【0020】また、薄紙と同様に厚紙においても第2分離斜面103に当接する範囲には強い抵抗力が加わる。ここで、給紙ローラ104より、これに打ち勝つ強い給送力が加えられたとしても、紙先端の下面のメクレが生じてしまう。これは、葉書、カード等を給紙した場合においても発生し、画像形成結果の全体的な美観を損なう結果となる。

【0021】さらに、常にシート先端と強い力で当接する事になるので、第2分離斜面103は摩耗が激しく、初期性能において薄紙重送防止と厚紙給紙能力のバランスを取った形で設定すると、多量の紙を通紙した場合、第2分離斜面103の摩耗により薄紙の重送が発生する場合がある。

【0022】そこで、本発明はこのような現状に鑑みてなされたものであり、シートを確実に給紙することができると共に、重送防止効果の高い給紙装置及びこれを備えた画像形成装置を提供することを目的とするものである。

#### 【0.023】

【課題を解決するための手段】本発明は、シート収納手

50

6

段に積載収納されたシートを給紙手段により送り出して分離斜面により1枚ずつ分離供給する給紙装置において、前記分離斜面を、第1分離斜面と、該第1分離斜面と比較して高い摩擦係数を有し、前記第1分離斜面に沿って且つ前記給紙手段により送り出されたシートの移動方向に移動可能に設けられた第2分離斜面とから構成し、前記第2分離斜面を、前記シート収納手段から送り出されたシートから加えられる力によって初期位置から前記第1分離斜面に沿ってシートの移動方向下流側に移動するように構成したことを特徴とするものである。

【0024】また本発明は、前記第2分離斜面は、前記シート収納手段から送り出されたシートから所定の大きさよりも大きな力が加えられたときに前記初期位置から前記第1分離斜面に沿ってシートの移動方向の下流側に移動し、シートから加えられる力が所定の大きさよりも小さくなると前記初期位置に戻るように構成したことを特徴とするものである。

【0025】また本発明は、前記第2分離斜面を保持する斜面保持部材を前記第1分離斜面に沿ったシートの移動方向に平行に移動可能に支持するガイド手段と、前記斜面保持部材を前記第1分離斜面に沿ったシートの移動方向の上流側の前記初期位置に向けて付勢する弾性部材とを有することを特徴とするものである。

【0026】また本発明は、前記第2分離斜面を前記第1分離斜面よりも収納されているシート側に突出させるか、又は、前記第2分離斜面と前記第1分離斜面とを同一面とすることを特徴とするものである。

【0027】また本発明は、前記給紙手段に対向する位置に前記第2分離斜面を配置し、該第2分離斜面を前記第1分離斜面よりも収納されているシートから離れた位置で移動可能に設けたことを特徴とするものである。

【0028】また本発明は、前記第1分離斜面に沿ったシートの移動方向下流側への前記第2分離斜面の移動に伴って該第2分離斜面を、収納されているシートから離れる側に移動するように構成したことを特徴とするものである。

【0029】また本発明は、前記第2分離斜面を保持する斜面保持部材と、前記第2分離斜面を前記斜面保持部材を介して移動可能に保持するベース部材と、前記ベース部材に設けられ、前記斜面保持部材の移動を案内する軌道面と、を備え、前記軌道面を前記第1分離斜面よりも傾斜させると共に、前記保持部材を略楔形状とすることにより、前記第1分離斜面に沿ったシートの移動方向下流側への前記第2分離斜面の移動に伴って該第2分離斜面を直線的に収納されているシートから離れるように移動させることを特徴とするものである。

【0030】また本発明は、前記第1分離斜面に沿ったシートの移動方向下流側への前記第2分離斜面の移動に伴って該第2分離斜面を非直線的に収納されているシートから離れるように構成したことを特徴とするものであ

特開2001-253580  
(P2001-253580A)

(5)

7

8

る。

【0031】また本発明は、前記第2分離斜面を保持する斜面保持部材と、前記第2分離斜面を前記斜面保持部材を介して移動可能に保持するベース部材と、前記ベース部材に設けられ、前記斜面保持部材に設けたボスが摺動可能に係合する円弧状に形成された長穴と、を備え、前記第1分離斜面に沿ったシートの移動方向下流側への前記第2分離斜面の移動に伴って該第2分離斜面を非直線的に収納されているシートから離れるようにしたことを見特徴とするものである。

【0032】また本発明は、初期位置では前記第2分離斜面を前記第1分離斜面より収納されているシート側に突出するように設け、前記第2分離斜面の移動により該第2分離斜面を突出した位置から前記第1分離斜面よりも収納されているシートから離れた側に引っ込んだ位置まで前記第2分離斜面が移動可能であることを特徴とするものである。

【0033】また本発明は、前記第1分離斜面及び前記第2分離斜面が配置されていない個所に前記給紙手段により送り出されたシートを案内するガイド部材を設け、該ガイド部材を、前記シート収納部のシート積載面に対して前記第1分離斜面より大きい鈍角をなす第1ガイド面と、該第1のガイド面と鈍角をなす第2ガイド面とを有することを特徴とするものである。

【0034】また本発明は、前記給紙手段と前記第1及び第2分離斜面との間に、前記給紙手段により送り出されたシートを前記積載されているシート側に押圧するための押圧手投を設けたことを特徴とするものである。

【0035】また本発明は、前記シート収納手段から送り出されるシートをシートの幅方向におけるセンターを基準として送り出されるように構成されており、前記第2分離斜面をシートの前記センターに対応する部分に配置し、前記第1分離斜面を前記第2分離斜面の両側に配置したことを特徴とするものである。

【0036】また本発明は、画像形成装置において、上記のいずれかの給紙装置と、該給紙装置から給送されたシートに画像を形成する画像形成部と、を備えたことを特徴とするものである。

### 【0037】

【発明の実施の形態】以下、本発明の実施の形態について図面を用いて詳細に説明する。図1は本発明の第1の実施の形態に係る給紙装置の構成を示す図である。なお、この給紙装置は、既述した図24に示すような画像形成装置に用いられるものである。

【0038】同図において、1はシートを収納するシート収納手段である給紙トレイ、4は給紙手段である給紙ローラ、5は駆動軸、6は給紙ローラ4を回転自在に保持し、かつ駆動軸5に対して回転自在に保持されている給紙ローラアームである。そして、駆動軸5の駆動は、この駆動軸5に固定された駆動ギヤ7、給紙ローラアーム

ム6に保持されたアイドラギヤ8a、8b、8c、8d、後述する図3に示す給紙ローラ4と一緒に保持された歯車4aを介して給紙ローラ4に伝達されるようになっている。なお、この駆動軸5は図示しない制御可能な駆動機構より、駆動制御されるようになっている。

【0039】また、同図において、2は給紙トレイ1の、シート(束)Sの先端に当接する当接面に配置された第1斜面である第1分離斜面であり、この第1分離斜面2はシート(束)Sを積載するシート積載面1aに対しθの角度(鈍角)を成すように配置されている。また、3は第1分離斜面2と平行に配置され、かつシート(束)Sの先端に当接する第2斜面である第2分離斜面であり、この第2分離斜面3は第1分離斜面2よりも高い摩擦係数をもつ部材で構成されている。

【0040】ここで、この第2分離斜面3は、図1のA方向矢視図である図2に示すように、左右の第1分離斜面2a、2bの間に挟まれた形で配置されている。そして、このような第2分離斜面3を設けることにより、薄紙の重送を防止するようしている。なお、同図において、10は搬送ローラ、18は搬送ローラ10の軸10aの一端に固定された搬送ギヤであり、この搬送ギヤ18を介して搬送ローラ10には図示しない駆動源からの駆動が伝達されるようになっている。

【0041】一方、図1において、9は第1及び第2分離斜面2、3、給紙トレイ1等を支持し、かつ第1分離斜面2及び第2分離斜面3が配置されていない範囲のシートガイド部材となるベース部材であるベースブロックである。また、11は図示しない付勢手段により搬送ローラ10と所定圧で接触している回転自在な搬送コロであり、この搬送コロ11と搬送ローラ10とにより、シートSが上面搬送ガイド12により上面をガイドされながら搬送されていくようになっている。

【0042】ところで、同図において、13はベースブロック9の外側面に設けられた第1ばね支持ボス、15は第2分離斜面3を保持すると共にベースブロック9により給紙方向、即ち第1分離斜面2に沿って上下方向に移動可能に保持された斜面保持部材である分離斜面ホルダ、16は分離斜面ホルダ15に設けられた第2ばね支持ボスである。また、14は一端が第1ばね支持ボス13に、他端が第2ばね支持ボス16にそれぞれ係止されている弾性部材としての付勢ばねである。

【0043】そして、このようにベースブロック9により給紙方向(シートの移動方向)に移動可能に保持された分離斜面ホルダ15に付勢ばね14を設けることにより、後述するように給紙動作が開始されたとき搬送ローラ10に向かって第1及び第2分離斜面2、3に沿ってシートが移動する際、分離斜面ホルダ15(第2分離斜面3)は、シートと共に付勢ばね14に抗しながら第1分離斜面2に沿って上方へ移動するようになっている。即ち、シートの移動方向の上流側の初期位置から下流側

50

特開2001-253580  
(P2001-253580A)

(6)

9

に移動することになる。

【0044】なお、ベースブロック9上には、図2に示すように分離斜面ホルダ15が移動可能な面を規定する軌道面が設けられており、さらに軌道面17には分離斜面ホルダ15の移動方向を決めるガイド手段としてのスリット19が上下方向に所定の間隔を設けて形成されている。そして、このようなスリット19に、分離斜面ホルダ15の底面に突設された突起19aを係止するよう 10 することにより、分離斜面ホルダ15（第2分離斜面3）の垂直方向の移動方向・移動範囲が規定されるようになっている。

【0045】また、図3は、図1におけるB-B断面図であり、本実施の形態において、第2分離斜面3は、同図に示すように第1分離斜面2a, 2bよりもシート積載領域側に僅かに突出している。なお、この第2分離斜面3の突出量は、薄紙重送防止と厚紙給紙能力とのバランスを取ることのできる量である。

【0046】次に、このように構成された給紙装置の給紙動作を図4～図6を用いて説明する。

【0047】給紙を開始する際は、まず図示しない駆動機構より駆動を受けた駆動軸5が回転し、この駆動軸5の回転は、給紙ローラアーム6内のアイドラギヤ8a, 8b, 8c, 8d（図1参照）を介して給紙ローラ4に伝達され、これにより給紙ローラ4は回転を始める。このとき、給紙ローラ4はシート積載面上におかれたシート（束）Sの中の最上位に位置するシートS1に圧接しているため、給紙ローラ4が回転を開始すると、最上位のシートS1には給紙ローラ4との摩擦力による給送力が作用する。

【0048】そして、この給送力により最上位のシート 30 S1は、シートS1の動きを止めようとする第1及び第2分離斜面2, 3により摩擦力に対する反力をうける。なお、この時、特に第2分離斜面3の摩擦係数が高いため、シートS1の直下に配置された次シートS2は動かないか、図4に示すようにシートS1より若干遅れて動作を始める。

【0049】ここで、次シートS2が動かなかった場合は問題の無い給紙動作となるが、次シートS2が動いた場合には、同図に示すように最上位のシートS1及び次シートS2の先端により、第2分離斜面3は力を受けるため、第2分離斜面3を保持する分離斜面ホルダ15も力を受ける。

【0050】そして、この力が、付勢ばね14の付勢力（所定の大きさの力）に打ち勝つ大きさとなった場合、第2分離斜面3と分離斜面ホルダ15は、軌道面17、スリット19により規定された動作範囲で上方向にシート先端の移動速度とほぼ等しい速度で移動し、これに伴い少なくとも最上位のシートS1の先端は、矢印に示すように上方向にたわみながら移動する。

【0051】この後、この最上位のシートS1のたわみ 50

10

量が所定量に至ると、最上位のシートS1の先端は第2分離斜面3上を滑る事が可能となり、このように最上位のシートS1が滑るようになると、第2分離斜面3に加わる力は次シートS2による力のみとなる。

【0052】このとき、次シートS2に加わっている力は最上位のシートS1と次シートS2との間の摩擦力より小さい（次シートS2が、その下に配置されたシートS3との間で生じる摩擦力をブレーキ力として受けている）ので、付勢ばね14の付勢力のほうが大きくなり、これにより第2分離斜面3（分離斜面ホルダ15）は、図5に示すように初期位置に戻る方向に移動を始め、給紙前の初期位置にまで復帰する。

【0053】そして、この分離斜面ホルダ15の移動に伴い第2分離斜面3に乗り上げて重送しかけていた次シートS2は、図6に示すようにシート（束）Sの元の位置に戻され、この結果、次シートS2の重送は防止される。なお、このとき最上位のシートS1は第2分離斜面3上を滑っているので、分離斜面ホルダ15の移動の影響は受けることはなく、この後、搬送ローラ10、搬送コロ11、ベースブロック9及び上面ガイド12により、図示しない画像形成装置へと搬送されてゆく。

【0054】なお、この分離斜面ホルダ15（第2分離斜面3）の移動量はシートの種類により異なる。即ち、薄紙給紙時は、分離斜面ホルダ15（第2分離斜面3）は、給紙力によりわずかに移動し、その後所定の位置に引き戻される。また、厚紙等、強く第2分離斜面3に突き当たるシートが給紙された際は、許容された動作範囲いっぱいまで分離斜面ホルダ15（第2分離斜面3）は移動する。

【0055】このように、第2分離斜面3を分離斜面ホルダ15及び付勢ばね14によって給紙方向に移動可能でかつ弾性的に保持することにより、シートの給送に伴い、シートと共に第2分離斜面3を移動させることができ、その際のシート先端の当接角及び当接量の変化により、シート先端の移動が容易となり、薄紙や貼り付き気味のシートの給紙が可能となる。

【0056】また、最上位のシートを給紙した後、付勢ばね14により第2分離斜面3を引き戻すと共に、このとき最上面以外のシートに対して第2分離斜面3の引き戻し力を作用させることにより、最上面以外のシートの重送を引き止めることができる。即ち、最上位のシートS1が第2分離斜面上を滑り始めると、第2分離斜面3を元の位置に戻る方向に移動させるようにすることにより、重送しかかったシートを、その戻る動作によりシート束に引き戻すことが可能となり、より条件の悪い薄紙、継ぎ足し面上の用紙などの重送も防止する事が可能となる。

【0057】なお、従来、第2分離斜面3のような摩擦係数の高い部材を斜面分離に用いると、厚紙の給紙性能が悪化する恐れがあるが、本実施の形態においては、第

特開2001-253580  
(P2001-253580A)

(7)

11

2分離斜面3がシート先端と等速度で移動可能であるため、厚紙の給紙性能は、第2分離斜面3を採用しなかつた場合とほぼ同等に維持する事が可能となる。

【0058】ところで、本実施の形態においては、第1分離斜面2の間に第2分離斜面3を配置したが（図2参照）、これ以外の配置・組み合わせをもってしても、同等の効果が得られる事は自明である。また、本体枠体に固定の給紙トレイ1をもつ給紙装置で説明したが、これが本体着脱可能な給紙トレイであっても、同等な効果が得られることも自明である。

【0059】次に、本発明の第2の実施の形態について説明する。

【0060】図7は、本実施の形態に係る給紙装置の構成を示す図である。なお、同図において、図1と同一符号は、同一又は相当部分を示している。

【0061】同図において、21は第2分離斜面、22は第2分離斜面21を保持すると共にベースブロック9により給紙方向に移動可能に保持された分離斜面ホルダ、23は分離斜面ホルダ22に設けられた第1ばね支持ボスである。また、24はシート（束）Sの上位を、給紙ローラ4と第1及び第2分離斜面2、22との間で下方向に押圧する押圧部材である押圧コロであり、25は押圧コロ24を保持するコロホルダである。

【0062】ここで、第2分離斜面21は、図7のC方向矢視図である図8に示すように、左右2個ずつ同一面となるように配された第1分離斜面2a、2b、2c、2dに挟まれると共に、図7におけるD-D断面の概略図である図9に示すように第1分離斜面2a、2b、2c、2dに比べて奥側、即ちシートSから離れる側に配置されている。

【0063】そして、このように第2分離斜面21を配置することにより、給紙動作を開始するまでは、シート（束）Sは第2分離斜面21に当接することなく、給紙動作が開始されると、後述するように縦波状に歪みながら第2分離斜面21に当接するようになっている。

【0064】なお、本実施の形態において、第2分離斜面21は給紙ローラ4に臨む（対応する）位置に配置されており、このような位置に第2分離斜面21を配置することにより、第2分離斜面21によって発生する分離力はシートSの中心線上に働くようになり、分離の際、シートSの進行方向が変わることができる。これにより、センター基準給紙において、より斜行等が発生しにくくすることができる。

【0065】また、図8に示すように、第1分離斜面2a、2bの外側に他の第1斜面2c、2dを設けることにより、内側の第1分離斜面2a、2b及び第2分離斜面3に当接しない範囲のシートを滑らかに屈曲させることができ、これにより多様な紙紙を有するシートに対する分離が可能になる。なお、この外側の第2斜面2c、2dは、内側の第1分離斜面2a、2bと平行ではあれ

ばよく、同面である必要はない。

【0066】一方、図9において、25a、25bは押圧コロ24a、24bを回転自在に保持するコロホルダ、27a、27bは給紙ローラアーム6に設けられたコロホルダ軸、26a、26bはコロホルダ軸27a、27bに巻装されると共に、コロホルダ25a、25bをそれぞれを付勢するコロばねである。

【0067】次に、このように構成された給紙装置の給紙動作を図10～図12を用いて説明する。

10 【0068】給紙が開始されると、給紙ローラ4が回転し、これにより最上位のシートS1には給紙ローラ4との摩擦力による給送力が作用する。そして、この給送力により最上位のシートS1は、まずシートS1の動きを止めようとする第1分離斜面2により摩擦力に対する反力をうける。

【0069】ここで、このように反力を受けても、本実施の形態においては、押圧コロ25によりシートSの姿勢が軽く規制されているため、薄紙などではシートの屈曲半径が小さくなるため、より第1分離斜面2に対するシート先端の当接力が強くなる。

【0070】また、この後、給紙ローラ4が更に回転すると、第2分離斜面21が第1分離斜面2（2a、2b、2c、2d）よりも奥側に配置されているため（図9参照）、シート先端は第2分離斜面21の正面において、図10に示すように縦波状の歪み50を生じながら第2分離斜面21に接するようになる。そして、このように縦波状の歪み50が生じた後、シート先端に加わる力により、最上位のシートS1は、図11に示すように分離斜面ホルダ22（第2分離斜面21）と共に初期位置から上方方向に移動する。

30 【0071】なお、ここで次シートS2も同様に歪みが発生した状態で第2分離斜面21に当接した状態で移動するが、最上位のシートS1が第2分離斜面21に対し滑り始めると、既述した第1の実施の形態と同様に、分離斜面ホルダ22と共に第2分離斜面21が付勢ばね14の付勢力で下方向の初期位置に移動し、これに伴いシートS2は押し下げられ、図12に示すようにシート束S上に戻される。

40 【0072】このように、押圧コロ25を設け、この押圧コロ25により薄紙シートの屈曲におけるたわみ率を増大させることにより、重送が起こりにくくすることができる。また、シートと第1及び第2分離斜面2、21との当接角のばらつき及び給紙による変動の影響を少なくすることができる。なお、この押圧コロ25は、厚紙を給紙する際には、厚紙の腰で押し上げられて給紙に必要な給紙力に対し、比較的小さな影響しか与えない。

【0073】さらに、第2分離斜面21を第1分離斜面2に対し奥側に配置することにより、薄紙等のシートはシート先端が変形した形で第2分離斜面21に当接するようになり、重送がより発生しにくくすることができ

50

特開2001-253580  
(P2001-253580A)

(8)

13

る。なお、厚紙は、上記の歪みを発生しにくいことから第2分離斜面21に触れないまま給紙されるようになるため、第2分離斜面21の影響が小さくなり、より安定な給紙が実現できる。

【0074】次に、本発明の第3の実施の形態について説明する。

【0075】図13は本実施の形態に係る給紙装置の構成を示す図である。なお、同図において、図7と同一符号は、同一又は相当部分を示している。

【0076】同図において、30は第2分離斜面、31 10は分離斜面ホルダ、35は分離斜面ホルダ（第2分離斜面30）を給紙方向に移動可能に保持すると共に、第1分離斜面2及び第2分離斜面30が配置されていない範囲のシートガイド部材となるベース部材であるベースブロックである。

【0077】また、32はベースブロック35の外側面に設けられた第1ばね保持軸、34は分離斜面ホルダ31に設けられた第2ばね保持軸、33は付勢ばねであり、この付勢ばね33は、第1ばね保持軸32と第2ばね保持軸34との間にかけられており、分離斜面ホルダ 20 31を図中央矢印の方向に付勢している。

【0078】また、36はベースブロック35に設けられ、分離斜面ホルダ31の移動可能方向を規定する軌道面であり、この軌道面36は第1分離斜面2に対して $\theta$ の角度をなしている。なお、本実施の形態において、分離斜面ホルダ31は、軌道面36との摺擦面と、第2分離斜面30を第1分離斜面2に対し平行に保持する保持面とを有する略楔型の形状を有している。

【0079】そして、このように軌道面36を第1分離斜面2に対して傾斜させると共に、分離斜面ホルダ31を略楔型の形状とすることにより、軌道面36に沿って分離斜面ホルダ31が上方移動すると、分離斜面ホルダ31は、第1分離斜面2よりも奥側に位置するようになっている。

【0080】一方、図14は図13のE方向矢視図であり、同図において35aは、ベースブロック35の第1及び第2分離斜面2、30が配置されていない範囲に設けられた第1のガイド面である第1の搬送面、35bは第1の搬送面35aの上方に設けられ、第1の搬送面35aと鈍角を成す第2のガイド面である第2の搬送面で 40ある。そして、これら第1及び第2の搬送面35a、35bにより、シートを案内するガイド部が形成される。なお、第1の搬送面35aは、図14におけるG-G断面図である図15に示すように、給紙トレイ1のに対して $\theta_1$ の角度をなしており、第2の搬送面35bは給紙トレイ1に対して $\theta_2$ の角度をなしている。

【0081】そして、このようにベースブロック35が2つの搬送面35a、35bを有することにより、厚紙給紙時にシート先端に加わる抵抗をより小さく、最適に設定することが可能となる。

14

【0082】また、本実施の形態において、第2分離斜面30は、第1分離斜面2と同面、或は図13におけるF-F断面図である図16に示すように、シートSから力が加えられていない場合には第1分離斜面2a、2bよりもシート積載部側に突出するようになっている。

【0083】次に、このように構成された給紙装置の給紙動作を図17～図19を用いて説明する。

【0084】給紙が開始されると、給紙ローラ4が回転し、これにより最上位のシートS1には給紙ローラ4との摩擦力による給送力が作用する。そして、この給送力により最上位のシートS1は、シートS1の動きを止めようとする第1及び第2分離斜面2、30により摩擦力に対する反力をうける。

【0085】このとき、シート先端より第2分離斜面30に搬送力が加えられると分離斜面ホルダ31は、図17に示すように軌道面36に沿って上昇すると共に、軌道面36の傾斜により、図18に示すように第1分離斜面2よりも徐々に奥側に移動する。

【0086】そして、このように分離斜面ホルダ31が移動すると、シートS1と第2分離斜面30との接触圧は減少し、既述した第1及び第2の実施の形態よりも早くシートS1の先端が第2分離斜面31に対して滑りはじめる。これにより、付勢ばね33による分離斜面ホルダ31（第2分離斜面30）の矢印方向への移動が早く始まる。

【0087】そして、このように分離斜面ホルダ31（第2分離斜面30）が移動すると、再び第2分離斜面30がシート積載部側に突出して（図16参照）重送しかけた次シートS2に当接し、この当接力により重送しかけた次シートS2は図19に示すように進行が止められることになる。

【0088】このように、給紙動作前、第2分離斜面30を第1分離斜面2に対して同面或はシート積載部側に突出させることにより、給紙動作を開始する時の分離性能を得ることができる。また、第2分離斜面30を給紙時、一時的にシート先端と等速で移動させて第1分離斜面2よりも奥側に移動させ、シート先端との当接力が弱まるようにすることにより、シート先端が第2分離斜面30を滑るようにすることができると共に、シート先端の歪みによる分離効果も得ることができる。

【0089】なお、厚紙給紙時においては、第2分離斜面30は給紙力により押し込まれ、第1分離斜面2よりも奥側に引っ込んだ位置にまで移動するので、シート先端に接触しなくなり、第2分離斜面30が無かった場合と同等の給紙動作を行うことができる。また、このように第2分離斜面30がシート先端に接触しないようにすることにより、給紙駆動に加える負荷がより小さくなり、対応可能な厚紙の上限が向上する。

【0090】なお、本実施の形態においては第1の搬送面35a及び第2の搬送面35bを有するベースブロッ

特開2001-253580  
(P2001-253580A)

(9)

15

ク35について説明したが、本発明はこれに限らず、異なる搬送角を持った2種類以上の搬送面、或は曲面で構成された搬送面を有するベースブロックであっても効果は同等である。

【0091】次に、本発明の第4の実施の形態について説明する。図20は本実施の形態に係る給紙装置の構成を説明する図である。なお、同図において、図7と同一符号は、同一又は相当部分を示している。

【0092】同図において、41は第2分離斜面、42は分離斜面ホルダ、40は分離斜面ホルダ42(第2分離斜面41)を給紙方向に移動可能に保持すると共に、第1分離斜面2及び第2分離斜面41が配置されていない範囲のシートガイド部材となるベース部材であるベースブロック、43は分離斜面ホルダ42の側面下部に設けられた第1ボス、44は分離斜面ホルダ42の側面上部に設けられた第2ボスである。なお、これら第1及び第2ボス43、44は、分離斜面ホルダ42の不図示の他側面にも対称的に配置されている。

【0093】また、45、46はベースブロック40に設けられると共に分離斜面ホルダ42を所定の範囲で可動に支持するよう第1及び第2ボス43、44を係止する湾曲した第1及び第2の長穴である。ここで、第1及び第2ボス43、44は、第2分離斜面41にシートSからの押付力が働いていない場合、図21の実線で書かれた位置に有り、シートSより押付力が働くと第1及び第2長穴45、46の形状に沿って移動するようになっている。

【0094】即ち、第1及び第2ボス43、44は、給紙動作初期においては、第1分離斜面2に対しθ1の角度の方向に移動し、押付力が強まると、第1及び第2長穴45、46の曲率Rにより進行方向を緩やかに変えた後、第1分離斜面2に対しθ2の角度に移動する。

【0095】そして、このように構成することにより、第2分離斜面41は、初期は第1分離斜面2よりも突出し、シートからの搬送力が加わると第1分離斜面2よりも奥側に移動するようになる。さらに、第1及び第2長穴45、46を湾曲させることにより、第2分離斜面41の上下方向の移動量と第1分離斜面2に対する凹凸量との関係を非直線的な関係とすることができます。

【0096】これにより、第1及び第2長穴45、46の形状を変えることにより、使用するシートの種類に応じて第2分離斜面41の挙動をさまざまに変えることが可能であり、より最適な設定を選ぶことが可能となる。また、第2分離斜面41が給紙直後の位置から元の位置に復帰する際、よりシート側に移動するよう設定することにより、重送しかけたシートを、より効果的に阻止することが可能となる。

【0097】

【発明の効果】以上説明したように本発明のように、第50

16

2斜面を第1斜面に沿って上下方向に移動可能とする一方、給紙の際には、第2斜面を最上位のシートの第1斜面に沿った移動に伴って上方移動させ、最上位のシートを分離した後は、下方移動させて移動前の位置に戻すようすることにより、シートを確実に給紙することができると共に、重送防止効果の高い給紙装置を実現することが可能になる。

## 【図面の簡単な説明】

【図1】本発明の第1の実施の形態に係る給紙装置の構成を示す図。

【図2】図1のA方向矢視図。

【図3】図1のB-B断面図。

【図4】上記給紙装置の給紙動作初期の状態を示す図。

【図5】上記給紙装置の給紙動作中期の状態を示す図。

【図6】上記給紙装置の給紙動作終期の状態を示す図。

【図7】本発明の第2の実施の形態に係る給紙装置の構成を示す図。

【図8】図7のC方向矢視図。

【図9】図7のD-D断面図。

【図10】上記給紙装置の給紙動作初期の状態を示す図。

【図11】上記給紙装置の給紙動作中期の状態を示す図。

【図12】上記給紙装置の給紙動作終期の状態を示す図。

【図13】本発明の第3の実施の形態に係る給紙装置の構成を示す図。

【図14】図13のE方向矢視図。

【図15】図14のG-G断面図。

【図16】図13のG-G断面図。

【図17】上記給紙装置の給紙動作初期の状態を示す図。

【図18】上記給紙装置の給紙動作中期の状態を示す図。

【図19】上記給紙装置の給紙動作終期の状態を示す図。

【図20】本発明に第4の実施の形態に係る給紙装置の構成を示す図。

【図21】上記給紙装置の要部拡大図。

【図22】従来の給紙装置の構成を示す図。

【図23】図22のA方向矢視図。

【図24】従来の給紙装置を備えた画像形成装置の概略を示した図。

## 【符号の説明】

1 カセット(シート収納手段)

1 a シート積載面

2, 2 a, 2 b, 2 c, 2 d 第1分離斜面

3 第2分離斜面

4 給紙ローラ(給紙手段)

9 ベースブロック(ベース部材)

特開2001-253580  
(P2001-253580A)

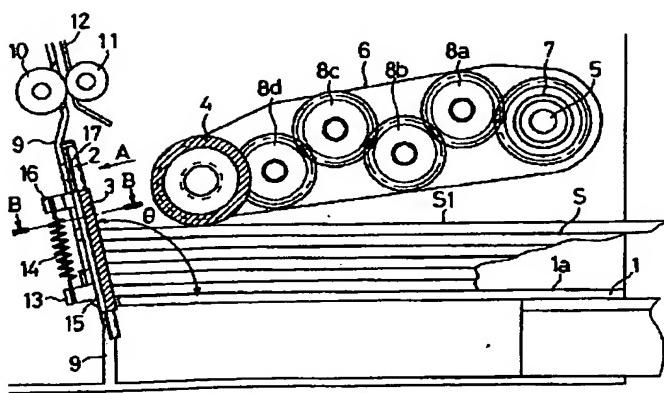
(10)

17

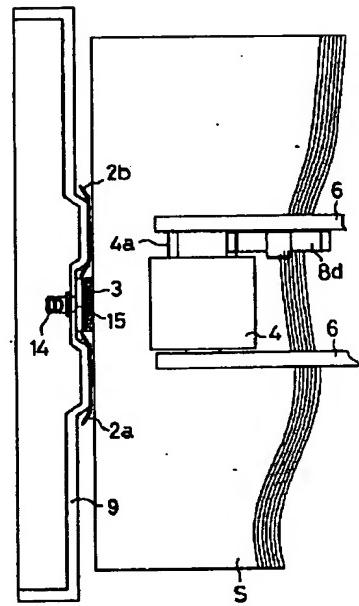
- |     |                 |
|-----|-----------------|
| 1 4 | 付勢ばね(弾性部材)      |
| 1 5 | 分離斜面ホルダ(斜面保持部材) |
| 1 7 | 軌道面             |
| 1 9 | スリット(ガイド手段)     |
| 2 2 | 分離斜面ホルダ(斜面保持部材) |
| 2 4 | 押圧コロ            |
| 3 0 | 第2分離斜面          |
| 3 1 | 分離斜面ホルダ(斜面保持部材) |
| 3 3 | 付勢ばね(弾性部材)      |

- |          |                 |
|----------|-----------------|
| 3 5      | ベースブロック(ベース部材)  |
| 3 5 a    | 第1の搬送面          |
| 3 5 b    | 第2の搬送面          |
| 3 6      | 軌道面             |
| 4 0      | ベースブロック(ベース部材)  |
| 4 1      | 第2分離斜面          |
| 4 2      | 分離斜面ホルダ(斜面保持部材) |
| 4 3, 4 4 | ボス              |
| 4 5, 4 6 | 長穴              |

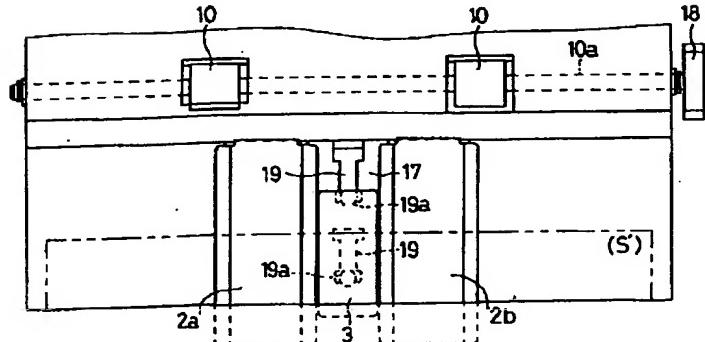
【図1】



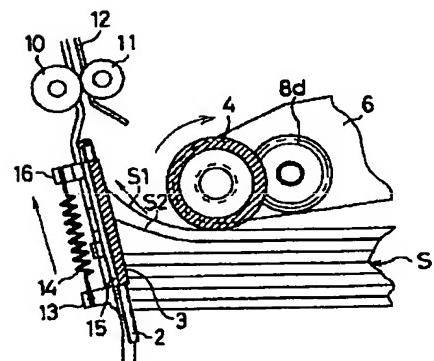
【図3】



【図2】



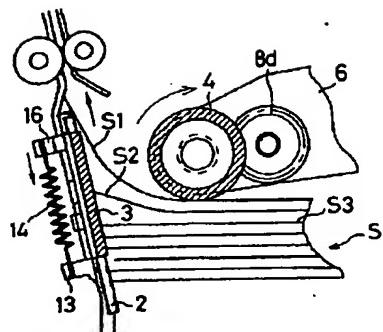
【図4】



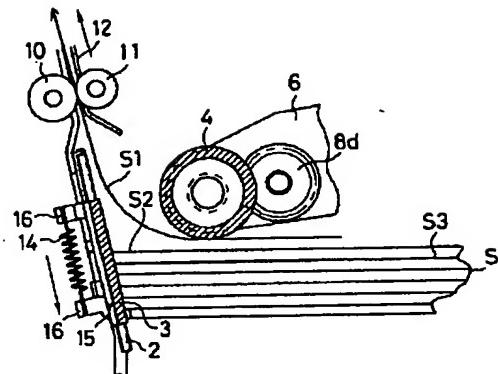
特開2001-253580  
(P2001-253580A)

( 11 )

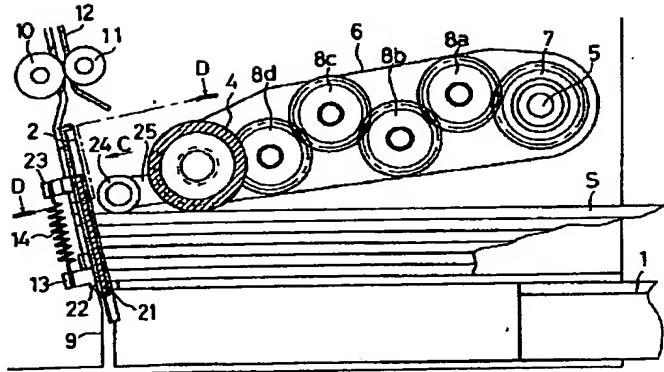
【図5】



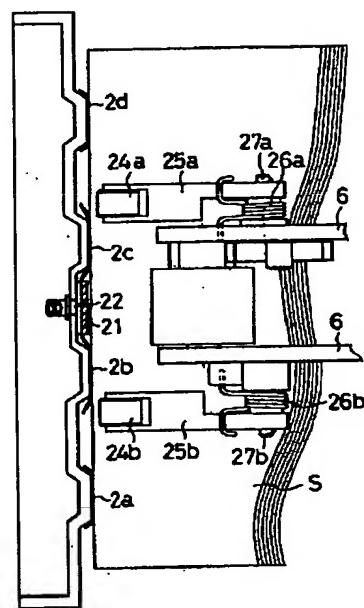
【四六】



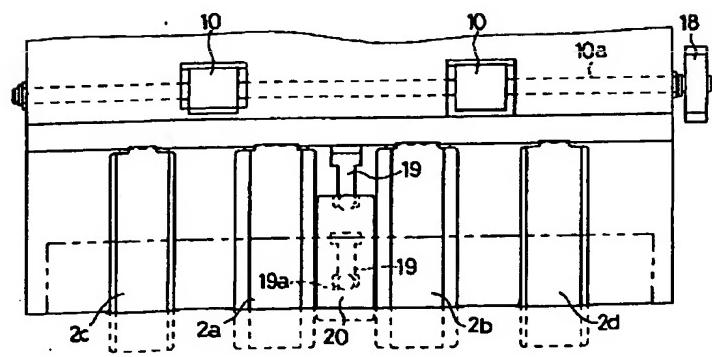
【图 7】



【図9】

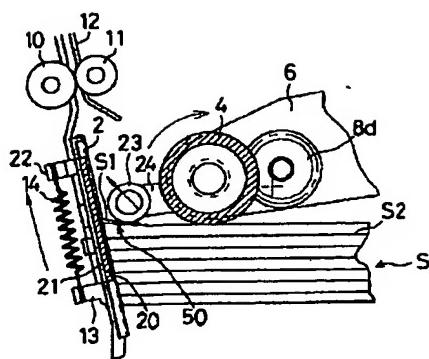


〔图8〕

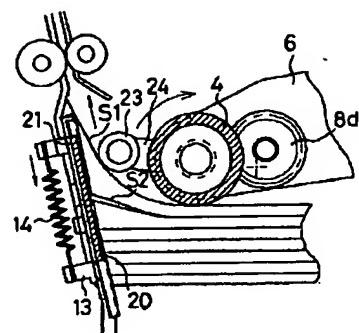


特開2001-253580  
(P2001-253580A)

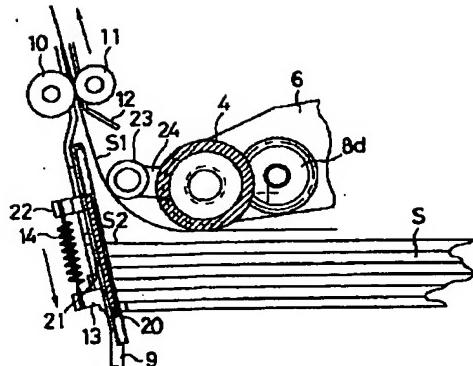
【図10】



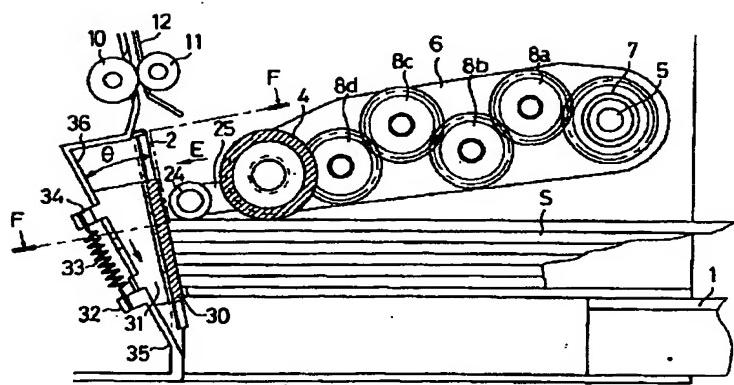
【図11】



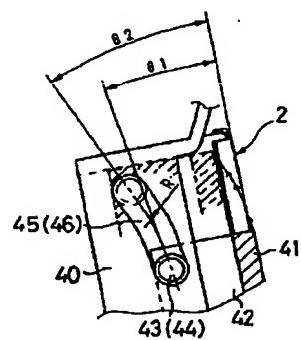
【図12】



【図13】



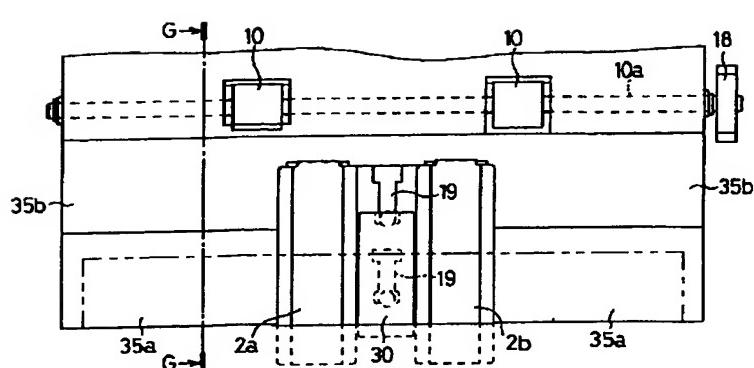
【図21】



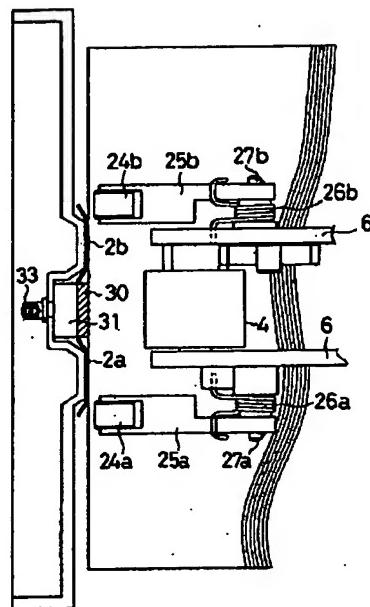
特開2001-253580  
(P2001-253580A)

(13)

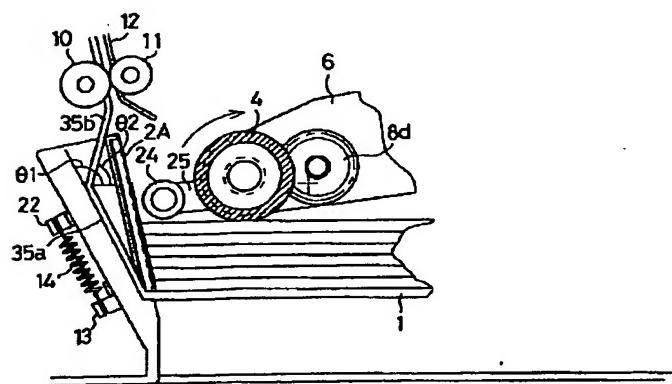
【図14】



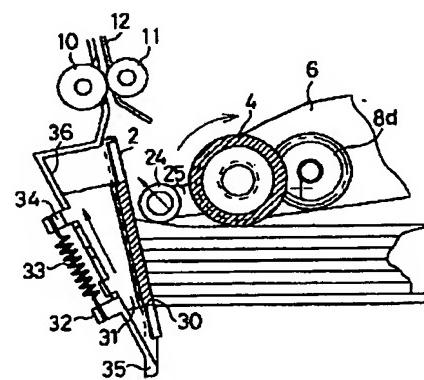
【図16】



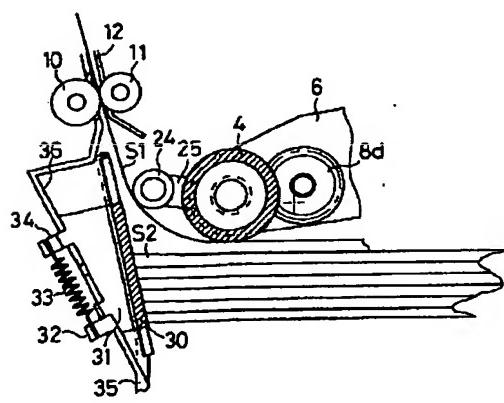
【図15】



【図17】



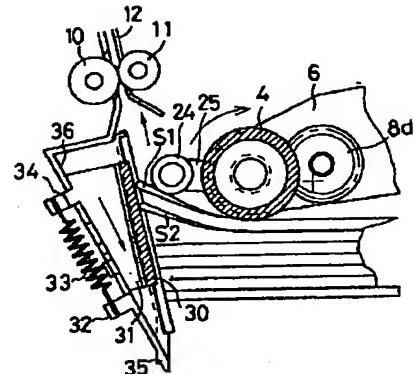
【図19】



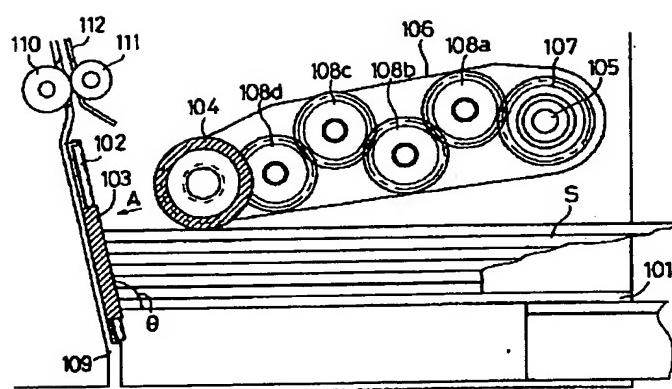
特開2001-253580  
(P2001-253580A)

(14)

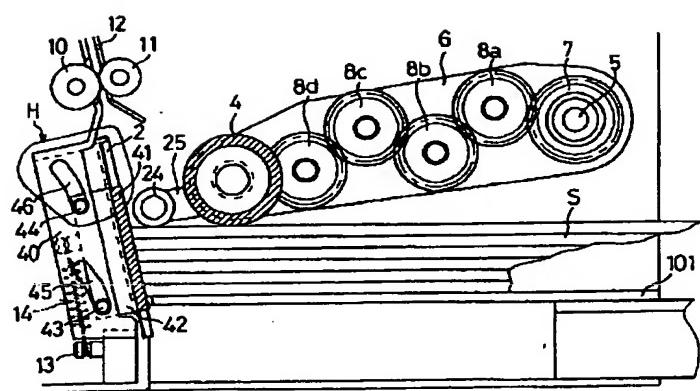
【図18】



【図22】



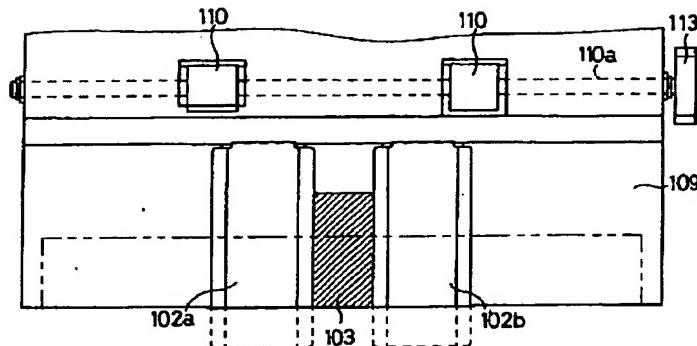
【図20】



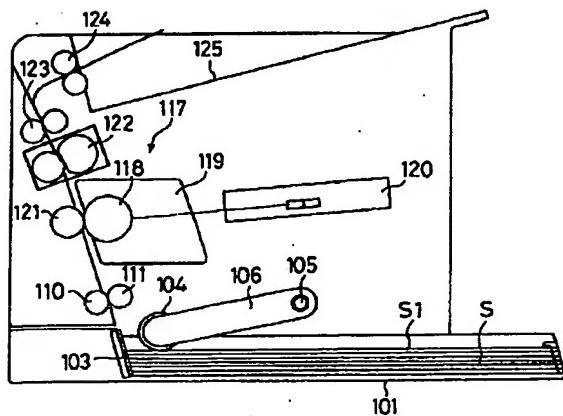
特開2001-253580  
(P2001-253580A)

(15)

【図23】



【図24】



フロントページの続き

(72)発明者 児島 隆一  
東京都大田区下丸子3丁目30番2号 キヤ  
ノン株式会社内

Fターム(参考) 3F343 FA02 FB01 FC01 GA01 GB01  
GC01 GD01 JA01 JD08 JD33  
JD35 JD40

## SHEET FEEDING DEVICE AND IMAGE FORMING DEVICE THEREWITH

Patent Number: JP2001253580

Publication date: 2001-09-18

Inventor(s): INOUE RYUKICHI; MATSUO YOSHIHIRO; KOJIMA RYUICHI

Applicant(s): CANON INC

Requested Patent:  JP2001253580

Application Number: JP20000069338 20000313

Priority Number(s):

IPC Classification: B65H3/52

EC Classification:

Equivalents:

### Abstract

**PROBLEM TO BE SOLVED:** To provide a sheet feeding device capable of feeding sheets positively and highly proofing the sheets against being fed with double conveyance, and an image forming device therewith.

**SOLUTION:** When the sheets are fed, the sheets S travels upward along a first slop 2 disposed at an angle  $\theta$  which is an obtuse angle to the sheet loading surface 1a of a sheet storage 1, by cooperative movement with a second slop 3 formed out of a member having higher friction factor than that of the first slop 2. The uppermost sheet S1 of the sheets S loaded and stored in the sheet storage 1 is separated from the other sheets. The second slop 3 is formed so as to move vertically along the first slop 2, so that the second slop 3 is moved upward with the uppermost sheet S1 moving along the first slop 2 when the sheets are fed, and it is moved downward and returned to its original position before movement when the uppermost sheet S1 is separated.

Data supplied from the esp@cenet database - I2

**\* NOTICES \***

Japan Patent Office is not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
  2. \*\*\*\* shows the word which can not be translated.
  3. In the drawings, any words are not translated.
- 

**CLAIMS**

---

[Claim(s)]

[Claim 1] In the feed equipment which sends out the sheet by which loading receipt was carried out to a sheet receipt means by the feed means, and carries out separation feed one sheet at a time by the separation slant face As compared with the 1st separation slant face and this 1st separation slant face, it has high coefficient of friction for the aforementioned separation slant face. It constitutes from a 2nd separation slant face prepared in the move direction of the sheet sent out by the aforementioned feed means along the aforementioned 1st separation slant face possible [ movement ]. Feed equipment characterized by constituting the aforementioned 2nd separation slant face so that it may move to the move direction downstream of a sheet along the aforementioned 1st separation slant face from an initial valve position according to the force applied from the sheet sent out from the aforementioned sheet receipt means.

[Claim 2] The aforementioned 2nd separation slant face is feed equipment according to claim 1 characterized by to constitute so that it may return to the aforementioned initial valve position, if the force which moves to the downstream of the move direction of a sheet along the aforementioned 1st separation slant face from the aforementioned initial valve position, and is applied from a sheet becomes smaller than a predetermined size when the bigger force than a predetermined size is applied from the sheet sent out from the aforementioned sheet receipt means.

[Claim 3] Feed equipment according to claim 2 carried out [ having a guide means to support the slant-face attachment component holding the aforementioned 2nd separation slant face possible / movement / in parallel in the move direction of the sheet along the aforementioned 1st separation slant face, and the elastic member which energizes the aforementioned slant-face attachment component towards the aforementioned initial valve position of the upstream of the move direction of the sheet along the aforementioned 1st separation slant face, and ] as the feature.

[Claim 4] Feed equipment according to claim 1 to 3 characterized by making the aforementioned 2nd separation slant face project to the sheet side contained rather than the aforementioned 1st separation slant face, or making the aforementioned 2nd separation slant face and the aforementioned 1st separation slant face into the same field.

[Claim 5] Feed equipment given in the claim 1 characterized by having arranged the aforementioned 2nd separation slant face in the position which counters the aforementioned feed means, and preparing this 2nd separation slant face possible [ movement ] in the position distant from the sheet contained rather than the aforementioned 1st separation slant face, or any 1 term of 3.

[Claim 6] Feed equipment according to claim 1 or 2 characterized by constituting so that this 2nd separation slant face may be moved to the side which separates from the sheet contained with movement of the aforementioned 2nd separation slant face to the move direction downstream of the sheet along the aforementioned 1st separation slant face.

[Claim 7] The slant-face attachment component holding the aforementioned 2nd separation slant face, and the base member which holds the aforementioned 2nd separation slant face possible [ movement ] through the aforementioned slant-face attachment component, While being prepared in the

aforementioned base member, having the raceway surface to which it shows movement of the aforementioned slant-face attachment component and making the aforementioned raceway surface incline rather than the aforementioned 1st separation slant face Feed equipment according to claim 6 characterized by moving this 2nd separation slant face with movement of the aforementioned 2nd separation slant face to the move direction downstream of the sheet which was along the aforementioned 1st separation slant face by making the aforementioned attachment component into the shape of an abbreviation wedge so that it may separate from the sheet contained linearly.

[Claim 8] Feed equipment according to claim 6 characterized by constituting this 2nd separation slant face with movement of the aforementioned 2nd separation slant face to the move direction downstream of the sheet along the aforementioned 1st separation slant face so that it may separate from the sheet contained in nonlinear.

[Claim 9] The slant-face attachment component holding the aforementioned 2nd separation slant face, and the base member which holds the aforementioned 2nd separation slant face possible [ movement ] through the aforementioned slant-face attachment component, The slot with which the boss who was prepared in the aforementioned base member and prepared in the aforementioned slant-face attachment component engages possible [ sliding ] and which was formed circularly, \*\*\*\*\*\*, feed equipment according to claim 8 characterized by making it separate from the sheet contained in nonlinear in this 2nd separation slant face with movement of the aforementioned 2nd separation slant face to the move direction downstream of the sheet along the aforementioned 1st separation slant face.

[Claim 10] The feed equipment of the publication by the claim 6 carry out that it can move in the aforementioned 2nd separation slant face to the position which withdrew into the side which is separated from the sheet contained rather than the aforementioned 1st separation slant face from the position which prepared the aforementioned 2nd separation slant face in an initial valve position so that it may project in the sheet side contained from the aforementioned 1st separation slant face, and projected this 2nd separation slant face by movement of the aforementioned 2nd separation slant face as the feature, or any 1 term of 9.

[Claim 11] Feed equipment given in the claim 1 or any 1 term of 10 characterized by providing the following. The 1st guide side which prepares the guide member which shows the sheet sent out by the aforementioned feed means to the part where the aforementioned 1st separation slant face and the aforementioned 2nd separation slant face are not arranged, and makes a larger obtuse angle than the aforementioned 1st separation slant face for this guide member to the sheet loading side of the aforementioned sheet stowage. this -- the 1st guide side and the 2nd guide side which makes an obtuse angle

[Claim 12] the [ the aforementioned feed means, the above 1st, and ] -- feed equipment given in the claim 1 characterized by preparing press \*\*\*\* for pressing the sheet sent out by the aforementioned feed means to the sheet side by which loading is carried out [ aforementioned ] between 2 separation slant faces, or any 1 term of 10

[Claim 13] Feed equipment given in the claim 1 characterized by to be constituted so that it may be sent out on the basis of a pin center,large [ in / the cross direction of a sheet / for the sheet sent out from the aforementioned sheet receipt means ], to have arranged the aforementioned 2nd separation slant face into the portion corresponding to the aforementioned pin center,large of a sheet, and to have arranged the aforementioned 1st separation slant face on both sides of the aforementioned 2nd separation slant face, or any 1 term of 10.

[Claim 14] Image formation equipment characterized by equipping the sheet with which it was fed from the feed equipment indicated by the aforementioned claim 1 or any 1 term of 13, and this feed equipment with the image formation section which forms a picture.

[Translation done.]

\* NOTICES \*

Japan Patent Office is not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

**DETAILED DESCRIPTION**

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] this invention relates to what separates a sheet especially with a slant-face separation method about image formation equipment equipped with feed equipment and this.

[0002]

[Description of the Prior Art] In conventional image formation equipment, there is a thing equipped with the feed equipment which separates into the image formation section one sheet at a time, and feeds a sheet to it. And as such feed equipment, by sticking a member with high coefficient of friction of a brush etc. on a slant face, there is a thing of the slant-face separation formula which raised separability ability, and such feed equipment has the thing of composition as shown in JP,11-11719,A.

[0003] Drawing 22 is drawing explaining the feed equipment which adopted such slant-face separation here, and the feed roller which held to one the medium tray to which 101 contains Sheet (bunch) S, and the gearing which 104 does not illustrate, and 105 are feed roller arms which hold a driving shaft and 106 free [ rotation of the feed roller 104 ], and are held free [ rotation ] to the driving shaft 105 in this drawing.

[0004] And the drive of a driving shaft 105 is transmitted to the feed roller 103 through the drive gear 107 fixed to this driving shaft 105, and the idler gears 108a, 108b, 108c, and 108d held at the feed roller arm 106.

[0005] On the other hand, in this drawing, 102 is the 1st separation slant face arranged in the field adjacent to the nose of cam of the sheet (bunch) S with which the medium tray 101 was contained, and this 1st separation slant face 102 is arranged so that the angle (obtuse angle) of theta may be accomplished to the loaded sheet (bunch) S. Moreover, 103 is the 2nd separation slant face which is fixed in parallel with the 1st separation slant face 102, and contacts at the nose of cam of Sheet (bunch) S, and this 2nd separation slant face 103 consists of members with coefficient of friction higher than the 1st separation slant face 102.

[0006] Here, this 2nd separation slant face 103 is arranged in the form inserted among the 1st separation slant faces 102a and 102b on either side, as shown in drawing 23 which is the direction view view of A of drawing 22. In addition, in this drawing, it is the conveyance gear by which 110 was fixed to the conveyance roller and 113 was fixed to the end of shaft 110a of the conveyance roller 110, and the drive from the driving source which is not illustrated is transmitted to the conveyance roller 110 through this conveyance gear 113.

[0007] moreover, drawing 22 -- setting -- 109 -- the [ the 1st and ] -- 2 separation slant faces 102,103 and medium tray 101 grade -- supporting -- the [ and ] -- the [ 1 separation slant face 102 and ] -- it is a base block used as the sheet guide member of the range by which 2 separation slant faces 103 are not arranged Furthermore, 111 is conveyance koro which touches by the conveyance roller 110 and place constant pressure by the energization means which is not illustrated and which can be rotated, and while the upper surface is guided to Sheet S by the upper surface conveyance guide 112 with this conveyance

koro 111 and the conveyance roller 110, it is conveyed by the non-illustrated image formation section. [0008] On the other hand, drawing 24 is drawing having shown the outline of image formation equipment equipped with the feed equipment of such composition, and 117 is the image formation section in this drawing. In addition, this image formation section 117 is equipped with the laser scanner 120 which forms a latent image on a photoconductor drum 118, a photoconductor drum 118, and the toner cartridge 119 which held to one a picture development means by which it did not illustrate and a photoconductor drum 118, and the imprint roller 121 which imprints on a sheet the toner picture which developed the latent image formed on the photoconductor drum 118 within the toner cartridge 119, and was formed.

[0009] the fixing assembly to which 122 is fixed to a sheet in a toner picture in this drawing, the 1st delivery roller pair to which 123 conveys the sheet after fixing, and 124 -- the 1st -- it prepares in the lower stream of a river of delivery roller pair 123 -- having -- the 1st -- the 2nd delivery roller pair which discharges the sheet conveyed from delivery roller pair 123 out of image formation equipment, and 125 are the delivery trays loading the discharged sheet S [ moreover, ]

[0010] Next, image formation operation in the image formation equipment constituted in this way is explained.

[0011] In case a picture is formed in a sheet, the driving shaft 105 which received the drive from the drive which is not illustrated probably rotates, rotation of this driving shaft 105 is transmitted to the feed roller 104 through the idler gears 108a, 108b, 108c, and 108d (refer to drawing 22 ) in the feed roller arm 106, and, thereby, the feed roller 104 begins rotation.

[0012] At this time, since the pressure welding of the feed roller 104 is carried out to the upper surface of the sheet S1 located in the most significant in the sheet (bunch) S contained by the medium tray 101, if the feed roller 104 starts rotation, the feed force by frictional force with the feed roller 104 will act on the sheet S1 of the most significant.

[0013] and -- if such feed force acts -- a sheet S1 -- the [ the 1st separation slant face 102 and ] -- 2 separation slant faces 103 -- a pressure welding -- carrying out -- the [ the 1st and ] -- the reaction force from 2 separation slant faces 102,103 is received here, if such reaction force is received, the nose of cam of a sheet S1 will bend -- having -- coming -- a sheet S1 -- rotation of the subsequent feed roller 104 -- the [ the 1st and ] -- while the nose of cam had run 2 separation slant-faces 102,103 top, a point will advance in the state where it was bent upward

[0014] Next, it is soon sold by the 1st separation slant face 102 and the 2nd separation slant face 103, and dissociates from other sheets, and the sheet S1 which ran in this way is conveyed by rotation of the conveyance roller 110 after this, and is sent into the nip of the development drum 118 and the imprint roller 121.

[0015] Here, on the development drum 118, the toner picture is formed by developing the latent image written in on the development drum 118 with the scanner 120 within a toner cartridge 119 at this time. Consequently, a toner picture is imprinted with the imprint roller 121 by the sheet S1 sent into the nip of the development drum 118 and the imprint roller 121.

[0016] Next, the sheet S1 with which the toner picture was imprinted in this way is conveyed by the fixing assembly 122, and a sheet S1 is fixed to a toner picture by this fixing assembly 122. then, the sheet S1 with which it was fixed to the toner picture -- the 1st -- delivery roller pair 123 and the 2nd -- it is discharged by delivery roller pair 124 out of image formation equipment, and is loaded on the delivery tray 125

[0017] By the way, in case a sheet S1 is separated, it is possible to usually separate only the sheet S1 of the most significant from other sheets only on the 1st separation slant face 102. However, when sheets, such as thin paper, are conveyed, for example and the feed force is added, a sheet S1 sticks to the 1st separation slant face 102, and serves as feeling. Then, as shown in drawing 23 mentioned already so that such a sheet could be separated certainly, the 2nd separation slant face 103 which has high coefficient of friction other than the 1st separation slant face 102 is formed, the force which resists movement of a sheet nose of cam by this 2nd separation slant face 103 is applied at the nose of cam of other sheets, and it is made to separate the sheet liable to a ball up.

[0018]

[Problem(s) to be Solved by the Invention] However, in such conventional feed equipment, since it was only a part for the elastic deformation of the surface of the 2nd separation slant face 103, or the whole, that a sheet can move since the 2nd separation slant face 103 which has high coefficient of friction is being fixed in parallel with the 1st separation slant face 102 had the following faults.

[0019] That is, since the force required in order to cause elastic deformation was large, the big brake force might work only into the portion which contacts the 2nd separation slant face of a sheet, and only the portion might cause deformation in thin paper.

[0020] Moreover, a strong resistance force joins the range which contacts the 2nd separation slant face 103 also in pasteboard like thin paper. Here, from the feed roller 104, though the strong feed force which overcomes this is applied, MEKURE of the inferior surface of tongue at the nose of cam of paper will arise. It generates, when paper is fed to a postcard, a card, etc., and this brings a result which spoils the overall fine sight of an image formation result.

[0021] Furthermore, since a sheet nose of cam will always be contacted by the strong force, when wear was intense, and set up in the form where thin \*\*\*\*\* prevention and pasteboard feeding capacity were balanced in the initial performance and a lot of papers are \*\*\*\*(ed), \*\*\* of thin paper may generate the 2nd separation slant face 103 by wear of the 2nd separation slant face 103.

[0022] Then, while this invention is made in view of such the present condition and being able to feed paper to a sheet certainly, it aims at offering image formation equipment equipped with the high feed equipment and this high of the \*\*\* prevention effect.

[0023]

[Means for Solving the Problem] In the feed equipment which this invention sends out the sheet by which loading receipt was carried out to a sheet receipt means by the feed means, and carries out separation feed one sheet at a time by the separation slant face As compared with the 1st separation slant face and this 1st separation slant face, it has high coefficient of friction for the aforementioned separation slant face. It constitutes from a 2nd separation slant face prepared in the move direction of the sheet sent out by the aforementioned feed means along the aforementioned 1st separation slant face possible [ movement ]. It is characterized by constituting the aforementioned 2nd separation slant face so that it may move to the move direction downstream of a sheet along the aforementioned 1st separation slant face from an initial valve position according to the force applied from the sheet sent out from the aforementioned sheet receipt means.

[0024] Moreover, the aforementioned 2nd separation slant face moves to the downstream of the move direction of a sheet along the aforementioned 1st separation slant face from the aforementioned initial valve position, when the bigger force than a predetermined size is applied from the sheet sent out from the aforementioned sheet receipt means, and this invention will be characterized by to constitute so that it may return to the aforementioned initial valve position, if the force applied from a sheet becomes smaller than a predetermined size.

[0025] Moreover, this invention carries out having a guide means to support the slant-face attachment component holding the aforementioned 2nd separation slant face possible [ movement ] in parallel in the move direction of the sheet along the aforementioned 1st separation slant face, and the elastic member which energizes the aforementioned slant-face attachment component towards the aforementioned initial valve position of the upstream of the move direction of the sheet along the aforementioned 1st separation slant face as the feature.

[0026] Moreover, this invention is characterized by making the aforementioned 2nd separation slant face project to the sheet side contained rather than the aforementioned 1st separation slant face, or making the aforementioned 2nd separation slant face and the aforementioned 1st separation slant face into the same field.

[0027] Moreover, this invention arranges the aforementioned 2nd separation slant face in the position which counters the aforementioned feed means, and is characterized by preparing this 2nd separation slant face possible [ movement ] in the position distant from the sheet contained rather than the aforementioned 1st separation slant face.

[0028] Moreover, this invention is characterized by constituting so that this 2nd separation slant face may be moved to the side which separates from the sheet contained with movement of the aforementioned 2nd separation slant face to the move direction downstream of the sheet along the aforementioned 1st separation slant face.

[0029] Moreover, the slant-face attachment component to which this invention holds the aforementioned 2nd separation slant face and the base member which holds the aforementioned 2nd separation slant face possible [ movement ] through the aforementioned slant-face attachment component, While being prepared in the aforementioned base member, having the raceway surface to which it shows movement of the aforementioned slant-face attachment component and making the aforementioned raceway surface incline rather than the aforementioned 1st separation slant face By making the aforementioned attachment component into the shape of an abbreviation wedge, it is characterized by moving this 2nd separation slant face with movement of the aforementioned 2nd separation slant face to the move direction downstream of the sheet along the aforementioned 1st separation slant face, so that it may separate from the sheet contained linearly.

[0030] Moreover, this invention is characterized by constituting this 2nd separation slant face with movement of the aforementioned 2nd separation slant face to the move direction downstream of the sheet along the aforementioned 1st separation slant face, so that it may separate from the sheet contained in nonlinear.

[0031] Moreover, the slant-face attachment component to which this invention holds the aforementioned 2nd separation slant face and the base member which holds the aforementioned 2nd separation slant face possible [ movement ] through the aforementioned slant-face attachment component, The slot with which the boss who was prepared in the aforementioned base member and prepared in the aforementioned slant-face attachment component engages possible [ sliding ] and which was formed circularly, It is characterized by making it separate from the sheet contained in nonlinear in this 2nd separation slant face with movement of the aforementioned 2nd separation slant face to the move direction downstream of the sheet along \*\*\*\*\* and the aforementioned 1st separation slant face.

[0032] Moreover, this invention prepares the aforementioned 2nd separation slant face in an initial valve position so that it may project in the sheet side contained from the aforementioned 1st separation slant face, and it carries out that it can move in the aforementioned 2nd separation slant face to the position which withdrew into the side which is separated from the sheet contained rather than the aforementioned 1st separation slant face from the position which projected this 2nd separation slant face by movement of the aforementioned 2nd separation slant face as the feature.

[0033] moreover, the 1st guide side this invention prepares the guide member which shows the sheet sent out by the aforementioned feed means to the part where the aforementioned 1st separation slant face and the aforementioned 2nd separation slant face are not arranged, and make a large obtuse angle than the aforementioned 1st separation slant face to the sheet loading side of the aforementioned sheet stowage in this guide member -- this -- it carries out having the 1st guide side and the 2nd guide side which make an obtuse angle as the feature

[0034] moreover, this invention -- the [ the aforementioned feed means, the above 1st, and ] -- it is characterized by preparing press \*\*\*\* for pressing the sheet sent out by the aforementioned feed means to the sheet side by which loading is carried out [ aforementioned ] between 2 separation slant faces

[0035] Moreover, this invention is characterized by being constituted so that it may be sent out on the basis of a pin center,large [ in / the cross direction of a sheet / for the sheet sent out from the aforementioned sheet receipt means ], having arranged the aforementioned 2nd separation slant face into the portion corresponding to the aforementioned pin center,large of a sheet, and having arranged the aforementioned 1st separation slant face on both sides of the aforementioned 2nd separation slant face.

[0036] Moreover, this invention is characterized by equipping the sheet with which it was fed from one of above feed equipment and these feed equipment with the image formation section which forms a picture in image formation equipment.

[0037]

[Embodiments of the Invention] Hereafter, the gestalt of operation of this invention is explained in detail

using a drawing. Drawing 1 is drawing showing the composition of the feed equipment concerning the gestalt of operation of the 1st of this invention. In addition, this feed equipment is used for image formation equipment as shown in drawing 24 mentioned already.

[0038] In this drawing, the medium tray which is a sheet receipt means by which 1 contains a sheet, the feed roller whose 4 is a feed means, and 5 are feed roller arms which hold a driving shaft and 6 free [ rotation of the feed roller 4 ], and are held free [ rotation ] to the driving shaft 5. And the drive of a driving shaft 5 is transmitted to the feed roller 4 through gearing 4a held at the drive gear 7 fixed to this driving shaft 5, the idler gears 8a, 8b, and 8c held at the feed roller arm 6, the feed roller 4 shown in drawing 3 mentioned later 8d, and one. In addition, drive control of this driving shaft 5 is carried out from the controllable drive which is not illustrated.

[0039] Moreover, in this drawing, 2 is the 1st separation slant face which is the 1st slant face arranged in the contact side which contacts at the nose of cam of Sheet (bunch) S of a medium tray 1, and this 1st separation slant face 2 is arranged so that the angle (obtuse angle) of theta may be accomplished to sheet loading side 1a loading Sheet (bunch) S. Moreover, it is the 2nd separation slant face which is the 2nd slant face which 3 is arranged in parallel with the 1st separation slant face 2, and contacts at the nose of cam of Sheet (bunch) S, and this 2nd separation slant face 3 consists of members with coefficient of friction higher than the 1st separation slant face 2.

[0040] Here, this 2nd separation slant face 3 is arranged in the form inserted among the 1st separation slant faces 2a and 2b on either side, as shown in drawing 2 which is the direction view view of A of drawing 1. And it is made to prevent \*\*\*\* of thin paper by forming such a 2nd separation slant face 3. In addition, in this drawing, it is the conveyance gear by which 10 was fixed to the conveyance roller and 18 was fixed to the end of shaft 10a of the conveyance roller 10, and the drive from the driving source which is not illustrated is transmitted to the conveyance roller 10 through this conveyance gear 18.

[0041] on the other hand -- drawing 1 -- setting -- 9 -- the [ the 1st and ] -- 2 separation slant faces 2 and 3 and medium tray 1 grade -- supporting -- the [ and ] -- the [ 1 separation slant face 2 and ] -- the base used as the sheet guide member of the range by which 2 separation slant faces 3 are not arranged -- it is the base block which is a member Moreover, 11 is conveyance koro which touches by the conveyance roller 10 and place constant pressure by the energization means which is not illustrated and which can be rotated, and while the upper surface is guided to Sheet S by the upper surface conveyance guide 12 with this conveyance koro 11 and the conveyance roller 10, it is conveyed.

[0042] by the way -- while the 1st spring support boss by whom 13 was prepared in the lateral surface of a base block 9, and 15 hold the 2nd separation slant face 3 in this drawing -- a base block 9 -- the feed direction, the [ i.e., ], -- the separation slant-face electrode holder which is the slant-face attachment component held possible [ movement in the vertical direction ] along 1 separation slant face 2, and 16 are the 2nd spring support bosses prepared in the separation slant-face electrode holder 15 Moreover, 14 is an energization spring as an elastic member with which an end is stopped by the 1st spring support boss 13, and the other end is stopped by the 2nd spring support boss 16, respectively.

[0043] And by forming the energization spring 14 in the separation slant-face electrode holder 15 held by the base block 9 possible [ movement in the feed direction (the move direction of a sheet) ] in this way the time of feed operation being started so that it may mention later -- the conveyance roller 10 -- going -- the [ the 1st and ] -- the separation slant-face electrode holder 15 (the 2nd separation slant face 3), in case a sheet moves along 2 separation slant faces 2 and 3 It moves upwards along the 1st separation slant face 2, resisting the energization spring 14 with a sheet. That is, it will move to a downstream from the initial valve position of the upstream of the move direction of a sheet.

[0044] In addition, on the base block 9, as shown in drawing 2, the raceway surface which specifies the field where the separation slant-face electrode holder 15 can move is prepared, and further, the slit 19 as a guide means to decide the move direction of the separation slant-face electrode holder 15 prepares a predetermined interval in the vertical direction, and is formed in the raceway surface 17. And the move directional movement range of the perpendicular direction of the separation slant-face electrode holder 15 (the 2nd separation slant face 3) is prescribed to such a slit 19 by by making it stop salient 19a which

protruded on the base of the separation slant-face electrode holder 15.

[0045] Moreover, drawing 3 is a B-B cross section in drawing 1, and in the gestalt of this operation, the 2nd separation slant face 3 is projected more slightly [ a sheet loading field side ] than the 1st separation slant faces 2a and 2b, as shown in this drawing. In addition, the amount of protrusions of this 2nd separation slant face 3 is an amount which can balance thin \*\*\*\*\* prevention and pasteboard feeding capacity.

[0046] Next, feed operation of the feed equipment constituted in this way is explained using drawing 4 - drawing 6.

[0047] In case feeding is started, the driving shaft 5 which received the drive from the drive which is not illustrated probably rotates, rotation of this driving shaft 5 is transmitted to the feed roller 4 through the idler gears 8a, 8b, 8c, and 8d (refer to drawing 1) in the feed roller arm 6, and, thereby, the feed roller 4 begins rotation. Since the pressure welding is carried out to the sheet S1 located in the most significant in the sheet (bunch) S which set the feed roller 4 on the sheet loading side at this time, if the feed roller 4 starts rotation, the feed force by frictional force with the feed roller 4 will act on the sheet S1 of the most significant.

[0048] the [ and / the 1st to which the sheet S1 of the most significant tends to stop the movement of a sheet S1 according to this feed force, and ] -- the reaction force to frictional force is received by 2 separation slant faces 2 and 3 In addition, at this time, especially the following sheet S2 arranged directly under a sheet S1 since coefficient of friction of the 2nd separation slant face 3 is high begins operation later than a sheet S1 a little, as it does not move or is shown in drawing 4.

[0049] Here, although it becomes satisfactory feed operation when the following sheet S2 does not move, when the following sheet S2 moves, as shown in this drawing, in order that the 2nd separation slant face 3 may receive the force, the separation slant-face electrode holder 15 holding the 2nd separation slant face 3 also receives the force by the nose of cam of the sheet S1 of the most significant, and the following sheet S2.

[0050] And when this force becomes the size which overcomes the energization force (force of a predetermined size) of the energization spring 14, the 2nd separation slant face 3 and the separation slant-face electrode holder 15 move upward by the operating range specified by the raceway surface 17 and the slit 19 at a speed almost equal to the traverse speed at the nose of cam of a sheet, and as shown in an arrow, while the nose of cam of the sheet S1 of the most significant at least bends upward in connection with this, they move.

[0051] Then, if the nose of cam of the sheet S1 of the most significant will become possible [ sliding on the 2nd separation slant-face 3 top ] if the amount of deflections of the sheet S1 of this most significant results in the specified quantity, and the sheet S1 of the most significant comes to be slippery in this way, the force of joining the 2nd separation slant face 3 will turn into only force by the following sheet S2.

[0052] At this time, the force in which it has joined the following sheet S2 is small (the following sheet S2 has received the frictional force produced between the sheets S3 arranged under it as breaking force) from the frictional force between the sheet S1 of the most significant, and the following sheet S2. Thereby, the way of the energization force of the energization spring 14 becomes large, and the 2nd separation slant face 3 (separation slant-face electrode holder 15) begins movement in the direction which returns to an initial valve position, as shown in drawing 5, and it returns even to the initial valve position before feeding.

[0053] And the following sheet S2 which is \*\*\*\*(ing) by running aground on the 2nd separation slant face 3 with movement of this separation slant-face electrode holder 15 is returned to the original position of Sheet (bunch) S, as shown in drawing 6, consequently \*\*\* of the following sheet S2 is prevented. In addition, at this time, since the sheet S1 of the most significant is sliding on the 2nd separation slant-face 3 top, the influence of movement of the separation slant-face electrode holder 15 does not win popularity, and is conveyed after this to the image formation equipment which is not illustrated by the conveyance roller 10, the conveyance koro 11, the base block 9, and the upper surface guide 12.

[0054] In addition, the movement magnitude of this separation slant-face electrode holder 15 (the 2nd

separation slant face 3) changes with kinds of sheet. That is, at the time of thin paper feeding, the separation slant-face electrode holder 15 (the 2nd separation slant face 3) moves slightly according to the feed force, and is pulled back by the position after that. moreover, when paper is fed to sheets which run against the 2nd separation slant face 3 strongly, such as pasteboard, the permitted until [ operating-range full ] separation slant-face electrode holder 15 (the 2nd separation slant face 3) moves [0055] thus -- by holding the 2nd separation slant face 3 elastically [ can move in the feed direction and ] with the separation slant-face electrode holder 15 and the energization spring 14, can move the 2nd separation slant face 3 with a sheet with feed of a sheet, and movement of a sheet nose of cam is easy by change of the contact angle at the nose of cam of a sheet in that case, and the amount of contact -- becoming -- thin paper -- it sticks and feeding of the sheet of feeling is attained

[0056] Moreover, after feeding paper to the sheet of the most significant, while pulling back the 2nd separation slant face 3 with the energization spring 14, \*\*\*\* of sheets other than the best side can be kept back by making the pull back force of the 2nd separation slant face 3 act to sheets other than the best side at this time. That is, by making it move the 2nd separation slant face 3 in the direction which returns to the original position, if the sheet S1 of the most significant begins to slide on the 2nd separation slant-face top, it becomes possible to pull back the sheet which cut only \*\*\*\* in a sheet bunch by the returning operation, and it becomes possible to also prevent \*\*\*\*, such as thin paper with more bad conditions, and a form on an extension side.

[0057] In addition, although there is a possibility that the feed performance of pasteboard may get worse when a member with high coefficient of friction like the 2nd separation slant face 3 is conventionally used for slant-face separation, since the 2nd separation slant face 3 can move at a sheet nose of cam and uniform velocity, in the gestalt of this operation, the feed performance of pasteboard turns into that it is possible to maintain almost on a par with the case where the 2nd separation slant face 3 is not adopted.

[0058] by the way, the thing for which an equivalent effect is acquired even if it carries out with the arrangement and combination other than this in the gestalt of this operation, although the 2nd separation slant face 3 has been arranged between the 1st separation slant faces 2 (refer to drawing 2 ) -- obvious -- it is . moreover -- although the feed equipment which has the medium tray 1 of fixation in a main part frame explained -- this -- a main part -- an equivalent effect is also acquired even if it is a removable medium tray -- obvious -- it is .

[0059] Next, the gestalt of operation of the 2nd of this invention is explained.

[0060] Drawing 7 is drawing showing the composition of the feed equipment concerning the gestalt of this operation. In addition, in this drawing, the same sign as drawing 1 shows the same or the considerable portion.

[0061] In this drawing, while 21 holds the 2nd separation slant face and 22 holds the 2nd separation slant face 21, the separation slant-face electrode holder held by the base block 9 possible [ movement in the feed direction ] and 23 are the 1st spring support bosses prepared in the separation slant-face electrode holder 22. 24 [ moreover, ] -- the high order of Sheet (bunch) S -- the [ the feed roller 4 the 1st, and ] -- the press pressed downward among 2 separation slant faces 2 and 22 -- it is the press koro which is a member and 25 is a koro electrode holder holding the press koro 24

[0062] As the 2nd separation slant face 21 is shown in drawing 8 which is the direction view view of C of drawing 7 here, while being inserted into the 1st separation slant faces 2a, 2b, 2c, and 2d allotted so that it might become the same field two right and left at a time As shown in drawing 9 which is the schematic diagram of the D-D cross section in drawing 7 , compared with the 1st separation slant faces 2a, 2b, 2c, and 2d, it is arranged at the side [ back /, i.e., separate from Sheet S, / the side ].

[0063] And if feed operation is started in contact with the 2nd separation slant face 21, Sheet (bunch) S will contact the 2nd separation slant face 21, being distorted in the shape of a longitudinal wave so that it may mention later, until it starts feed operation by arranging the 2nd separation slant face 21 in this way.

[0064] In addition, in the gestalt of this operation, by arranging the 2nd separation slant face 21 in the position which attends the feed roller 4 (it corresponds), and arranging the 2nd separation slant face 21 in such a position, the separating power generated by the 2nd separation slant face 21 comes to work on

the center line of Sheet S, and it can prevent the travelling direction of Sheet S changing in the case of separation. This can make a skew etc. harder to generate in pin center, large criteria feeding.

[0065] Moreover, as shown in drawing 8, by establishing other 1st slant face 2c and 2d in the outside of the 1st separation slant faces 2a and 2b, the sheet of inside 1st separation slant-face 2a and the range which 2b reaches and does not contact the 2nd separation slant face 3 can be made crooked smoothly, and the separation to the sheet which has various \*\*\*\* by this is attained. In addition, if the 2nd slant face 2c and 2d of this outside is parallel to the inside 1st separation slant faces 2a and 2b, it needs to be good and does not need to be these fields.

[0066] On the other hand, they are a koro spring which energizes each for the koro electrode holders 25a and 25b while the koro electrode-holder shafts 27a and 27b are looped around the koro electrode holder with which 25a and 25b hold the press koro 24a and 24b free [ rotation ] in drawing 9, the koro electrode-holder shaft with which 27a and 27b were prepared in the feed roller arm 6, and 26a and 26b.

[0067] Next, feed operation of the feed equipment constituted in this way is explained using drawing 10 - drawing 12.

[0068] If feeding is started, the feed roller 4 will rotate and, thereby, the feed force by frictional force with the feed roller 4 will act on the sheet S1 of the most significant. And the sheet S1 of the most significant receives the reaction force to frictional force according to this feed force by the 1st separation slant face 2 which is going to stop the movement of a sheet S1 first.

[0069] Here, in thin paper, even if it receives reaction force in this way, since the posture of Sheet S is lightly regulated by the press koro 25 in the gestalt of this operation, since the incursion radius of a sheet becomes small, the contact force at the nose of cam of a sheet over the 1st separation slant face 2 becomes strong more.

[0070] Moreover, if the feed roller 4 rotates further after this, since the 2nd separation slant face 21 is arranged at the back side rather than the 1st separation slant face 2 (2a, 2b, 2c, 2d) (refer to drawing 9), a sheet nose of cam comes to touch the 2nd separation slant face 21 at the transverse plane of the 2nd separation slant face 21, producing the distortion 50 of the shape of a longitudinal wave, as shown in drawing 10. And according to the force in which it is added at the nose of cam of a sheet, after the distortion 50 of the shape of a longitudinal wave arises in this way, the sheet S1 of the most significant moves to above from an initial valve position with the separation slant-face electrode holder 22 (the 2nd separation slant face 21), as shown in drawing 11.

[0071] In addition, although the following sheet S2 also moves here where the 2nd separation slant face 21 is contacted, after distortion had occurred similarly Like [ when the sheet S1 of the most significant begins to be slippery to the 2nd separation slant face 21 ] the gestalt of the 1st operation mentioned already In connection with this, the 2nd separation slant face 21 moves to a down initial valve position by the energization force of the energization spring 14 with the separation slant-face electrode holder 22, and a sheet S2 is depressed, and as shown in drawing 12, it is returned on the sheet bunch S.

[0072] Thus, \*\*\*\* can make it hard to happen by forming the press koro 25 and increasing the flexibility factor in incursion of a thin paper sheet by this press koro 25. the [ moreover, / a sheet, the 1st, and ] -- influence of change by dispersion and feeding of a contact angle with 2 separation slant faces 2 and 21 can be lessened In addition, in case this press koro 25 feeds paper to pasteboard, it is pushed up with the waist of pasteboard and has only comparatively small influence to the feed force required for feeding.

[0073] Furthermore, \*\*\*\* can be made harder for sheets, such as thin paper, to come to contact the 2nd separation slant face 21 in the form which deformed the sheet nose of cam, and to generate by arranging the 2nd separation slant face 21 to a back side to the 1st separation slant face 2. In addition, the influence of the 2nd separation slant face 21 becomes small, and pasteboard can realize more stable feeding, in order to feed paper, being unable to touch the 2nd separation slant face 21 since it is hard to generate the above-mentioned distortion.

[0074] Next, the gestalt of operation of the 3rd of this invention is explained.

[0075] Drawing 13 is drawing showing the composition of the feed equipment concerning the gestalt of this operation. In addition, in this drawing, the same sign as drawing 7 shows the same or the

considerable portion.

[0076] while the 2nd separation slant face and 31 hold a separation slant-face electrode holder and, as for 30, 35 holds a separation slant-face electrode holder (the 2nd separation slant face 30) possible [ movement in the feed direction ] in this drawing -- the [ the 1st separation slant face 2 and ] -- the base used as the sheet guide member of the range by which 2 separation slant faces 30 are not arranged -- it is the base block which is a member

[0077] Moreover, the 1st spring maintenance shaft with which 32 was prepared in the lateral surface of a base block 35, the 2nd spring maintenance shaft with which 34 was prepared in the separation slant-face electrode holder 31, and 33 are energization springs, and this energization spring 33 is covered between the 1st spring maintenance shaft 32 and the 2nd spring maintenance shaft 34, and is energizing the separation slant-face electrode holder 31 in the direction of the arrow in drawing.

[0078] Moreover, 36 is prepared in a base block 35, it is the raceway surface which specifies the movable direction of the separation slant-face electrode holder 31, and this raceway surface 36 is making the angle of theta to the 1st separation slant face 2. In addition, in the gestalt of this operation, the separation slant-face electrode holder 31 has the configuration of the abbreviation wedge action die which has \*\*\*\*\* with a raceway surface 36, and the maintenance side which holds the 2nd separation slant face 30 in parallel to the 1st separation slant face 2.

[0079] And if the separation slant-face electrode holder 31 carries out upper part movement along with a raceway surface 36 by making the separation slant-face electrode holder 31 into the configuration of an abbreviation wedge action die while making a raceway surface 36 incline to the 1st separation slant face 2 in this way, the separation slant-face electrode holder 31 is located in a back side rather than the 1st separation slant face 2.

[0080] on the other hand -- drawing 14 -- the direction view view of E of drawing 13 -- it is -- this drawing -- setting -- 35a -- the [ of a base block 35 / the 1st and ] -- the 1st conveyance side and 35b which are the 1st guide side established in the range by which 2 separation slant faces 2 and 30 are not arranged are 2nd conveyance side which is the 2nd guide side which is prepared above 1st conveyance side 35a, and accomplishes 1st conveyance side 35a and an obtuse angle And the guide section to which it shows a sheet is formed of these [ 1st ] and the 2nd conveyance side 35a and 35b. In addition, as 1st conveyance side 35a is shown in drawing 15 which is a G-G cross section in drawing 14, the angle of theta 1 is made to the medium tray 1's, and 2nd conveyance side 35b is making the angle of theta 2 to the medium tray 1.

[0081] And when a base block 35 has two conveyance sides 35a and 35b in this way, it becomes possible to be more small at the time of pasteboard feeding, and to set up at it the resistance added at the nose of cam of a sheet the optimal.

[0082] Moreover, in the gestalt of this operation, the 2nd separation slant face 30 projects in a sheet loading section side rather than the 1st separation slant faces 2a and 2b, when the force is not applied from Sheet S, as shown in drawing 16 which is an F-F cross section in the 1st separation slant face 2, this field, or drawing 13.

[0083] Next, feed operation of the feed equipment constituted in this way is explained using drawing 17 - drawing 19.

[0084] If feeding is started, the feed roller 4 will rotate and, thereby, the feed force by frictional force with the feed roller 4 will act on the sheet S1 of the most significant. the [ and / the 1st to which the sheet S1 of the most significant tends to stop the movement of a sheet S1 according to this feed force, and ] -- the reaction force to frictional force is received by 2 separation slant faces 2 and 30

[0085] If the conveyance force is applied to the 2nd separation slant face 30 from a sheet nose of cam at this time, the separation slant-face electrode holder 31 will move to a back side gradually rather than the 1st separation slant face 2 by the inclination of a raceway surface 36, as shown in drawing 18, while going up along with a raceway surface 36, as shown in drawing 17.

[0086] And if the separation slant-face electrode holder 31 moves in this way, the contact pressure of a sheet S1 and the 2nd separation slant face 30 will decrease, and the nose of cam of a sheet S1 will begin to slide on it to the 2nd separation slant face 31 early rather than the gestalt of the 1st mentioned already

and the 2nd operation. Thereby, movement in the direction of an arrow of the separation slant-face electrode holder 31 (the 2nd separation slant face 30) with the energization spring 33 starts early.

[0087] and -- if the separation slant-face electrode holder 31 (the 2nd separation slant face 30) moves in this way -- again -- the 2nd separation slant face 30 -- a sheet loading section side -- projecting -- \*\*\*\* (refer to drawing 16) -- a beam -- degree sheet S2 -- contacting -- this contact force -- \*\*\* -- a beam -- advance will be stopped as degree sheet S2 is shown in drawing 19

[0088] Thus, the separability ability when starting feed operation can be obtained before feed operation by making the 2nd separation slant face 30 project to a this field or sheet loading section side to the 1st separation slant face 2. Moreover, when moving the 2nd separation slant face 30 at a sheet nose of cam and uniform velocity temporarily at the time of feeding, making it move to a back side and making it the contact force with the nose of cam of a sheet become weaker rather than the 1st separation slant face 2, while a sheet nose of cam can slide on the 2nd separation slant face 30, the separation effect by distortion of a sheet nose of cam can also be acquired.

[0089] In addition, the 2nd separation slant face 30 is pushed in by the feed force at the time of pasteboard feeding, and since it moves even to the position from which it withdrew into the back side rather than the 1st separation slant face 2, feed operation equivalent to the case where it stops having contacted at the nose of cam of a sheet, and there is no 2nd separation slant face 30 can be performed. Moreover, in this way, when making it the 2nd separation slant face 30 not contact at the nose of cam of a sheet, the load applied to a feed drive becomes smaller, and the upper limit of the pasteboard which can respond improves.

[0090] In addition, although the base block 35 which has 1st conveyance side 35a and 2nd conveyance side 35b in the gestalt of this operation was explained, the effect is equivalent even if this invention is a base block which has two or more kinds of conveyance sides not only with this but a different conveyance angle, or the conveyance side which consisted of curved surfaces.

[0091] Next, the form of operation of the 4th of this invention is explained. Drawing 20 is drawing explaining the composition of the feed equipment concerning the form of this operation. In addition, in this drawing, the same sign as drawing 7 shows the same or the considerable portion.

[0092] In this drawing, while the 2nd separation slant face and 42 hold a separation slant-face electrode holder and 40 holds the separation slant-face electrode holder 42 (the 2nd separation slant face 41) possible [ movement in the feed direction ], 41 the [ the 1st separation slant face 2 and ] -- the base used as the sheet guide member of the range by which 2 separation slant faces 41 are not arranged -- the base block which is a member, the 1st boss by whom 43 was prepared in the side lower part of the separation slant-face electrode holder 42, and 44 are the 2nd boss prepared in the side upper part of the separation slant-face electrode holder 42 In addition, these [ 1st ] and the 2nd boss 43 and 44 are stationed symmetrically also at the other sides in which it does not illustrate [ of the separation slant-face electrode holder 42 ].

[0093] Moreover, 45 and 46 are the 1st and 2nd curved slots which stop the 1st and 2nd bosses 43 and 44 so that the separation slant-face electrode holder 42 may be supported movable in the predetermined range while being prepared in a base block 40. Here, when the pressing force from Sheet S is not working on the 2nd separation slant face 41, the 1st and 2nd bosses 43 and 44 are in the position written as the solid line of drawing 21, and if sheet left-hand-lay pressing force works, they will move in accordance with the configuration of the 1st and 2nd slots 45 and 46.

[0094] That is, in the early stages of feed operation, if it moves in the angle direction of theta 1 to the 1st separation slant face 2 and pressing force becomes strong, the 1st and 2nd bosses 43 and 44 will move to the angle of theta 2 to the 1st separation slant face 2, after changing travelling direction gently with the curvature R of the 1st and 2nd slots 45 and 46.

[0095] And by constituting in this way, if it projects rather than the 1st separation slant face 2 and the conveyance force from a sheet is added the first stage, it will come to move the 2nd separation slant face 41 to a back side rather than the 1st separation slant face 2. Furthermore, relation between the movement magnitude of the vertical direction of the 2nd separation slant face 41 and the amount of irregularity to the 1st separation slant face 2 can be considered as a nonlinear relation by incurvating the 1st and 2nd

slots 45 and 46.

[0096] This becomes it is possible to change the behavior of the 2nd separation slant face 41 variously according to the kind of sheet to be used, and possible [ choosing the more nearly optimal setup ] by changing the configuration of the 1st and 2nd slots 45 and 46. Moreover, in case the 2nd separation slant face 41 returns to the original position from the position immediately after feeding, it becomes possible [ \*\*\*\* ] by setting up so that it may move to a sheet side more to prevent a beam sheet more effectively.

[0097]

[Effect of the Invention] As explained above, while enabling movement of the 2nd slant face in the vertical direction along the 1st slant face like this invention, in the case of feeding After carrying out upper part movement of the 2nd slant face with movement along the 1st slant face of the sheet of the most significant and separating the sheet of the most significant While being able to feed paper to a sheet certainly by carrying out lower part movement and making it return to the position before movement, it becomes possible to realize the high feed equipment of the \*\*\*\* prevention effect.

---

[Translation done.]

\* NOTICES \*

Japan Patent Office is not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

PRIOR ART

[Description of the Prior Art] In conventional image formation equipment, there is a thing equipped with the feed equipment which separates into the image formation section one sheet at a time, and feeds a sheet to it. And as such feed equipment, by sticking a member with high coefficient of friction of a brush etc. on a slant face, there is a thing of the slant-face separation formula which raised separability ability, and such feed equipment has the thing of composition as shown in JP,11-11719,A.

[0003] Drawing 22 is drawing explaining the feed equipment which adopted such slant-face separation here, and the feed roller which held to one the medium tray to which 101 contains Sheet (bunch) S, and the gearing which 104 does not illustrate, and 105 are feed roller arms which hold a driving shaft and 106 free [ rotation of the feed roller 104 ], and are held free [ rotation ] to the driving shaft 105 in this drawing.

[0004] And the drive of a driving shaft 105 is transmitted to the feed roller 103 through the drive gear 107 fixed to this driving shaft 105, and the idler gears 108a, 108b, 108c, and 108d held at the feed roller arm 106.

[0005] On the other hand, in this drawing, 102 is the 1st separation slant face arranged in the field adjacent to the nose of cam of the sheet (bunch) S with which the medium tray 101 was contained, and this 1st separation slant face 102 is arranged so that the angle (obtuse angle) of theta may be accomplished to the loaded sheet (bunch) S. Moreover, 103 is the 2nd separation slant face which is fixed in parallel with the 1st separation slant face 102, and contacts at the nose of cam of Sheet (bunch) S, and this 2nd separation slant face 103 consists of members with coefficient of friction higher than the 1st separation slant face 102.

[0006] Here, this 2nd separation slant face 103 is arranged in the form inserted among the 1st separation slant faces 102a and 102b on either side, as shown in drawing 23 which is the direction view view of A of drawing 22. In addition, in this drawing, it is the conveyance gear by which 110 was fixed to the conveyance roller and 113 was fixed to the end of shaft 110a of the conveyance roller 110, and the drive from the driving source which is not illustrated is transmitted to the conveyance roller 110 through this conveyance gear 113.

[0007] moreover, drawing 22 -- setting -- 109 -- the [ the 1st and ] -- 2 separation slant faces 102,103 and medium tray 101 grade -- supporting -- the [ and ] -- the [ 1 separation slant face 102 and ] -- it is a base block used as the sheet guide member of the range by which 2 separation slant faces 103 are not arranged Furthermore, 111 is conveyance koro which touches by the conveyance roller 110 and place constant pressure by the energization means which is not illustrated and which can be rotated, and while the upper surface is guided to Sheet S by the upper surface conveyance guide 112 with this conveyance koro 111 and the conveyance roller 110, it is conveyed by the non-illustrated image formation section.

[0008] On the other hand, drawing 24 is drawing having shown the outline of image formation equipment equipped with the feed equipment of such composition, and 117 is the image formation section in this drawing. In addition, this image formation section 117 is equipped with the laser scanner 120 which forms a latent image on a photoconductor drum 118, a photoconductor drum 118, and the toner cartridge 119 which held to one a picture development means by which it did not illustrate and a

photoconductor drum 118, and the imprint roller 121 which imprints on a sheet the toner picture which developed the latent image formed on the photoconductor drum 118 within the toner cartridge 119, and was formed.

[0009] the fixing assembly to which 122 is fixed to a sheet in a toner picture in this drawing, the 1st delivery roller pair to which 123 conveys the sheet after fixing, and 124 -- the 1st -- it prepares in the lower stream of a river of delivery roller pair 123 -- having -- the 1st -- the 2nd delivery roller pair which discharges the sheet conveyed from delivery roller pair 123 out of image formation equipment, and 125 are the delivery trays loading the discharged sheet S [ moreover, ]

[0010] Next, image formation operation in the image formation equipment constituted in this way is explained.

[0011] In case a picture is formed in a sheet, the driving shaft 105 which received the drive from the drive which is not illustrated probably rotates, rotation of this driving shaft 105 is transmitted to the feed roller 104 through the idler gears 108a, 108b, 108c, and 108d (refer to drawing 22 ) in the feed roller arm 106, and, thereby, the feed roller 104 begins rotation.

[0012] At this time, since the pressure welding of the feed roller 104 is carried out to the upper surface of the sheet S1 located in the most significant in the sheet (bunch) S contained by the medium tray 101, if the feed roller 104 starts rotation, the feed force by frictional force with the feed roller 104 will act on the sheet S1 of the most significant.

[0013] and -- if such feed force acts -- a sheet S1 -- the [ the 1st separation slant face 102 and ] -- 2 separation slant faces 103 -- a pressure welding -- carrying out -- the [ the 1st and ] -- the reaction force from 2 separation slant faces 102,103 is received here, if such reaction force is received, the nose of cam of a sheet S1 will bend -- having -- coming -- a sheet S1 -- rotation of the subsequent feed roller 104 -- the [ the 1st and ] -- while the nose of cam had run 2 separation slant-faces 102,103 top, a point will advance in the state where it was bent upward

[0014] Next, it is soon sold by the 1st separation slant face 102 and the 2nd separation slant face 103, and dissociates from other sheets, and the sheet S1 which ran in this way is conveyed by rotation of the conveyance roller 110 after this, and is sent into the nip of the development drum 118 and the imprint roller 121.

[0015] Here, on the development drum 118, the toner picture is formed by developing the latent image written in on the development drum 118 with the scanner 120 within a toner cartridge 119 at this time. Consequently, a toner picture is imprinted with the imprint roller 121 by the sheet S1 sent into the nip of the development drum 118 and the imprint roller 121.

[0016] Next, the sheet S1 with which the toner picture was imprinted in this way is conveyed by the fixing assembly 122, and a sheet S1 is fixed to a toner picture by this fixing assembly 122. then, the sheet S1 with which it was fixed to the toner picture -- the 1st -- delivery roller pair 123 and the 2nd -- it is discharged by delivery roller pair 124 out of image formation equipment, and is loaded on the delivery tray 125

[0017] By the way, in case a sheet S1 is separated, it is possible to usually separate only the sheet S1 of the most significant from other sheets only on the 1st separation slant face 102. However, when sheets, such as thin paper, are conveyed, for example and the feed force is added, a sheet S1 sticks to the 1st separation slant face 102, and serves as feeling. Then, as shown in drawing 23 mentioned already so that such a sheet could be separated certainly, the 2nd separation slant face 103 which has high coefficient of friction other than the 1st separation slant face 102 is formed, the force which resists movement of a sheet nose of cam by this 2nd separation slant face 103 is applied at the nose of cam of other sheets, and it is made to separate the sheet liable to a ball up.

[Translation done.]

\* NOTICES \*

Japan Patent Office is not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

**DESCRIPTION OF DRAWINGS**

[Brief Description of the Drawings]

[Drawing 1] Drawing showing the composition of the feed equipment concerning the gestalt of operation of the 1st of this invention.

[Drawing 2] The direction view view of A of drawing 1 .

[Drawing 3] The B-B cross section of drawing 1 .

[Drawing 4] Drawing showing the state in early stages of [ feed operation ] the above-mentioned feed equipment.

[Drawing 5] Drawing showing the state in the middle of [ feed operation ] the above-mentioned feed equipment.

[Drawing 6] Drawing showing the state of the telophase of feed operation of the above-mentioned feed equipment.

[Drawing 7] Drawing showing the composition of the feed equipment concerning the gestalt of operation of the 2nd of this invention.

[Drawing 8] The direction view view of C of drawing 7 .

[Drawing 9] The D-D cross section of drawing 7 .

[Drawing 10] Drawing showing the state in early stages of [ feed operation ] the above-mentioned feed equipment.

[Drawing 11] Drawing showing the state in the middle of [ feed operation ] the above-mentioned feed equipment.

[Drawing 12] Drawing showing the state of the telophase of feed operation of the above-mentioned feed equipment.

[Drawing 13] Drawing showing the composition of the feed equipment concerning the gestalt of operation of the 3rd of this invention.

[Drawing 14] The direction view view of E of drawing 13 .

[Drawing 15] The G-G cross section of drawing 14 .

[Drawing 16] The G-G cross section of drawing 13 .

[Drawing 17] Drawing showing the state in early stages of [ feed operation ] the above-mentioned feed equipment.

[Drawing 18] Drawing showing the state in the middle of [ feed operation ] the above-mentioned feed equipment.

[Drawing 19] Drawing showing the state of the telophase of feed operation of the above-mentioned feed equipment.

[Drawing 20] Drawing showing the 4th composition of the gestalt \*\*\*\* feeding equipment of operation in this invention.

[Drawing 21] The important section enlarged view of the above-mentioned feed equipment.

[Drawing 22] Drawing showing the composition of conventional feed equipment.

[Drawing 23] The direction view view of A of drawing 22 .

[Drawing 24] Drawing having shown the outline of image formation equipment equipped with

conventional feed equipment.

[Description of Notations]

1 Cassette (Sheet Receipt Means)

1a Sheet loading side

2, 2a, 2b, 2c, the 2d 1st separation slant face

3 2nd Separation Slant Face

4 Feed Roller (Feed Means)

9 Base Block (Base Member)

14 Energization Spring (Elastic Member)

15 Separation Slant-Face Electrode Holder (Slant-Face Attachment Component)

17 Raceway Surface

19 Slit (Guide Means)

22 Separation Slant-Face Electrode Holder (Slant-Face Attachment Component)

24 Press Koro

30 2nd Separation Slant Face

31 Separation Slant-Face Electrode Holder (Slant-Face Attachment Component)

33 Energization Spring (Elastic Member)

35 Base Block (Base Member)

35a The 1st conveyance side

35b The 2nd conveyance side

36 Raceway Surface

40 Base Block (Base Member)

41 2nd Separation Slant Face

42 Separation Slant-Face Electrode Holder (Slant-Face Attachment Component)

43 44 Boss

45 46 Slot

---

[Translation done.]

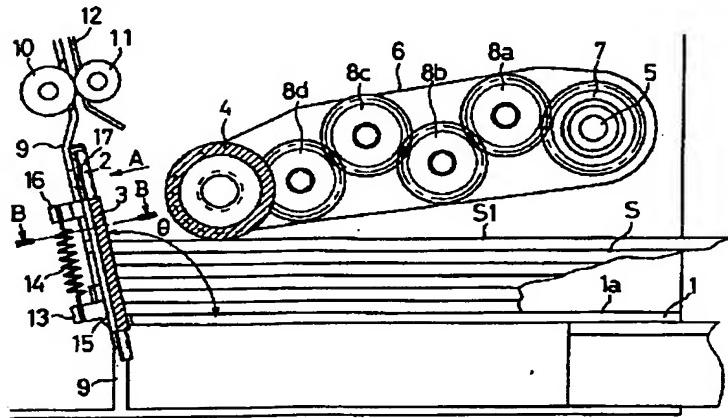
## NOTICES \*

Japan Patent Office is not responsible for any damages caused by the use of this translation.

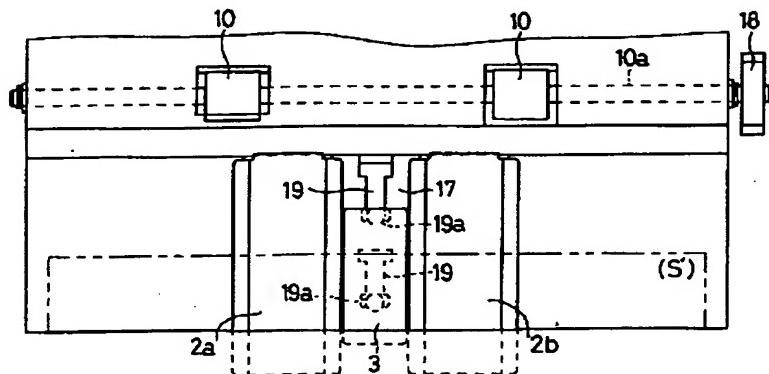
1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

## DRAWINGS

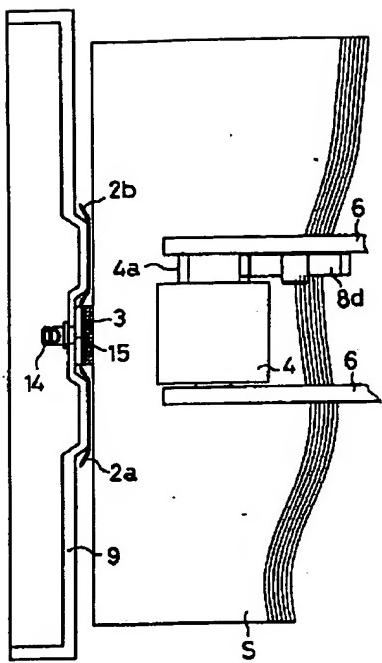
[Drawing 1]



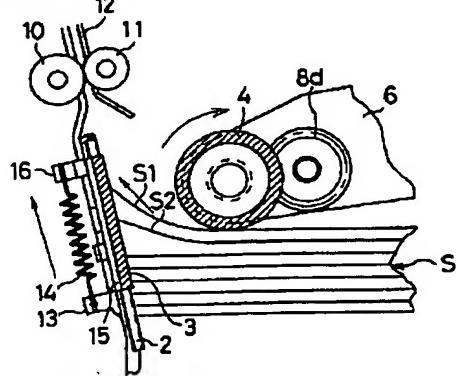
[Drawing 2]



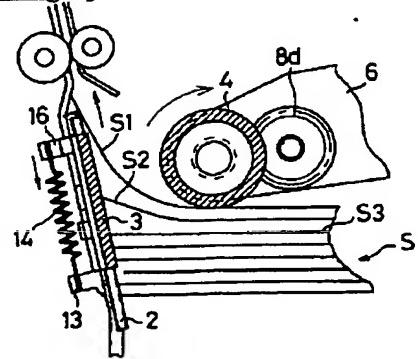
[Drawing 3]



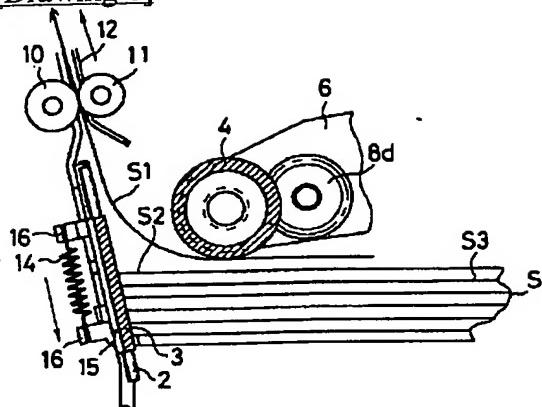
[Drawing 4]



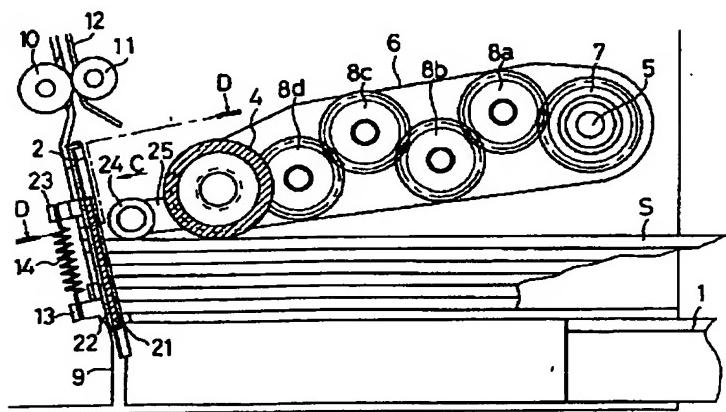
[Drawing 5]



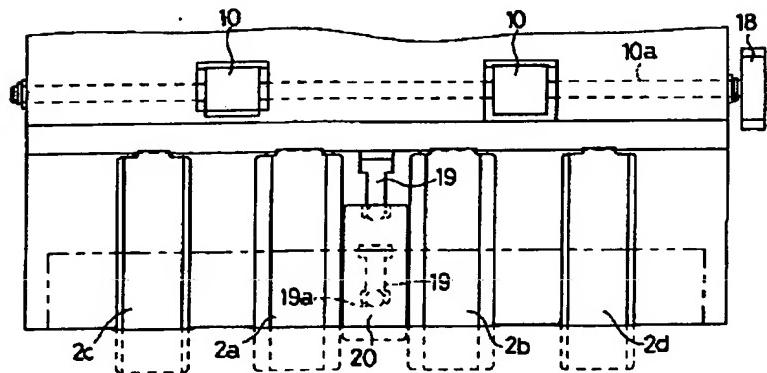
### [Drawing 6]



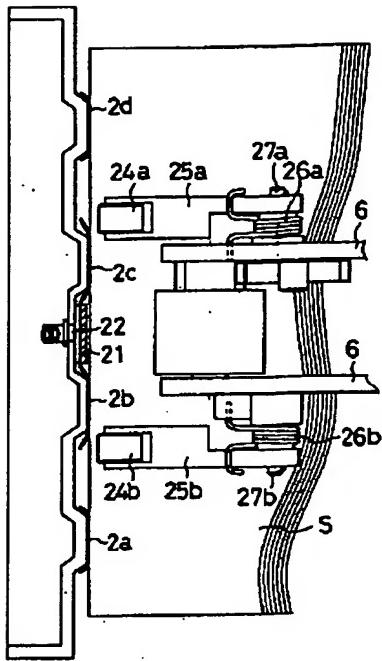
### [Drawing 7]



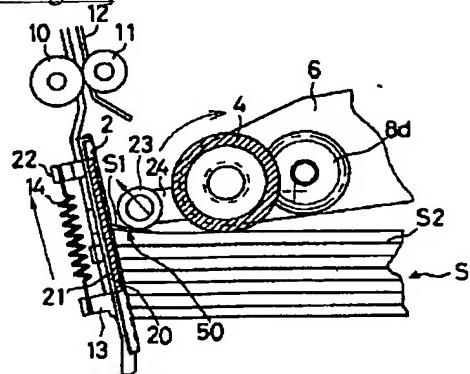
[Drawing 8]



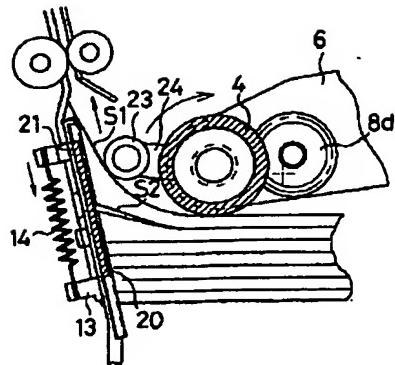
[Drawing 9]



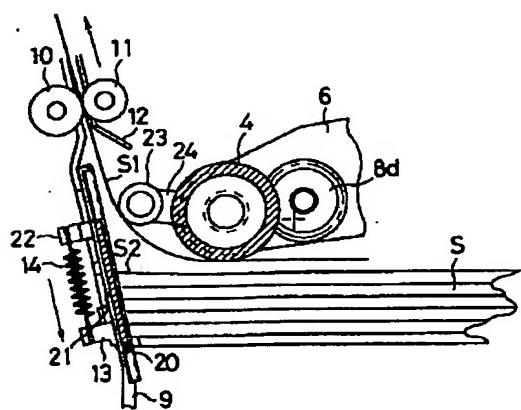
[Drawing 10]



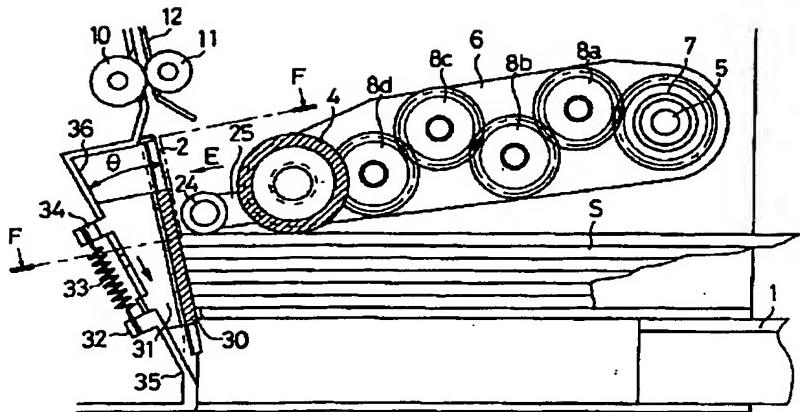
[Drawing 11]



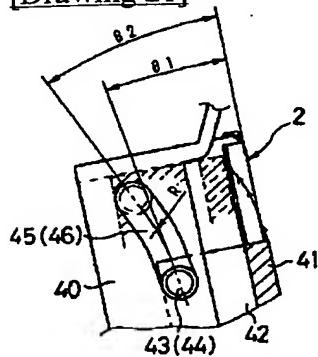
[Drawing 12]



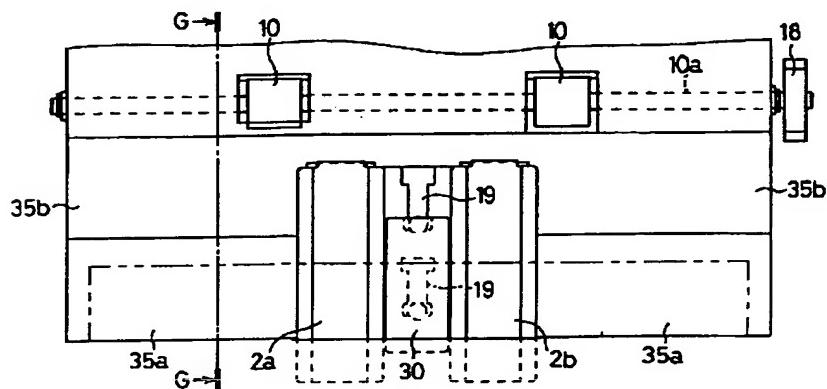
[Drawing 13]



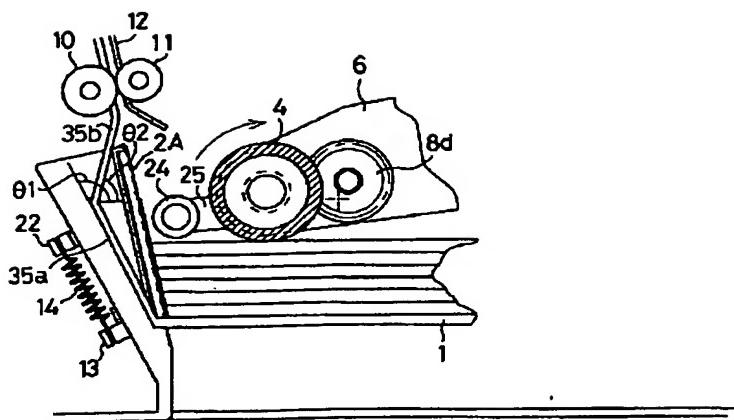
[Drawing 21]



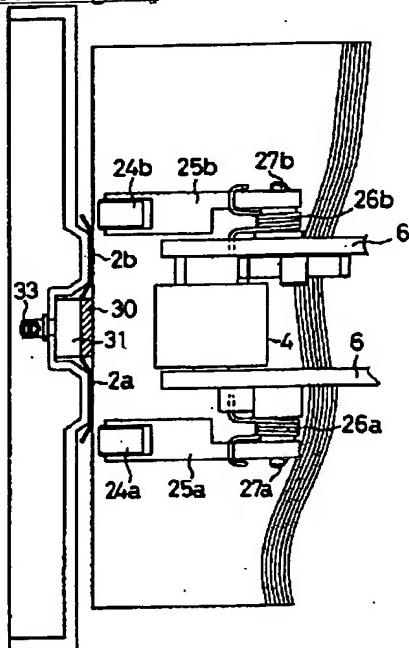
[Drawing 14]



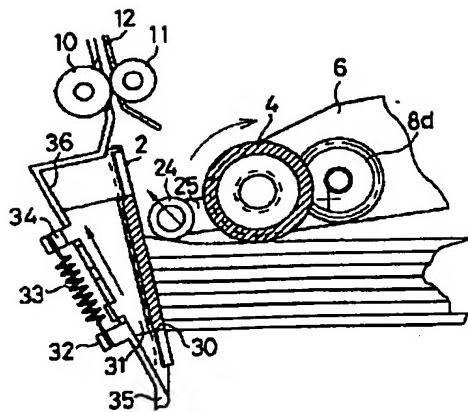
[Drawing 15]



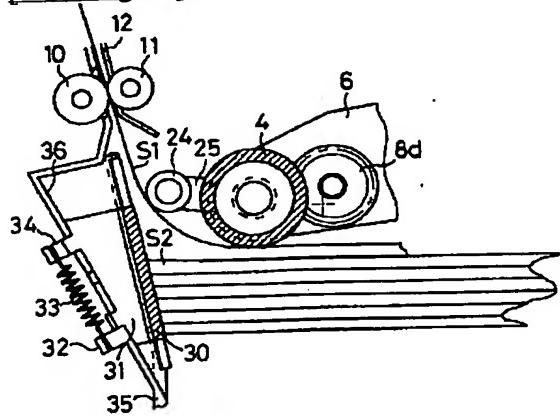
[Drawing 16]



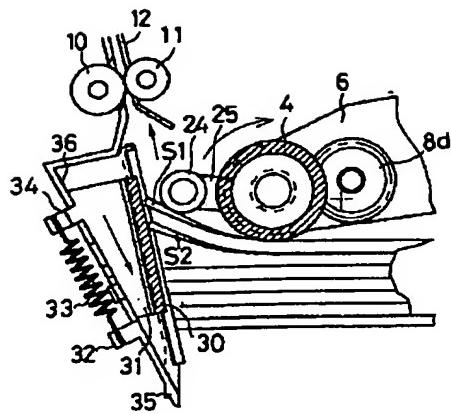
[Drawing 17]



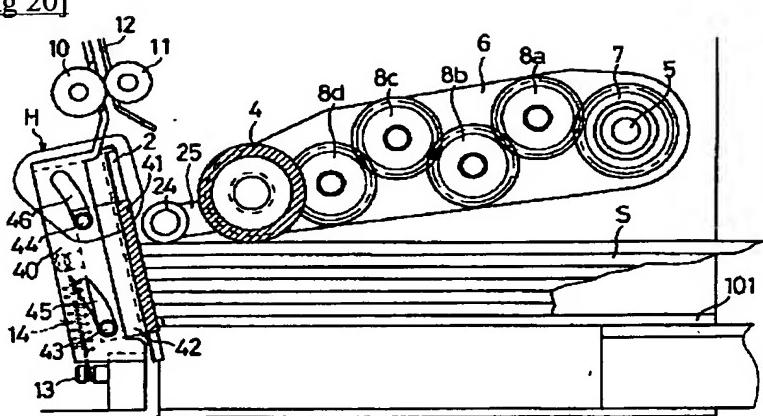
[Drawing 19]



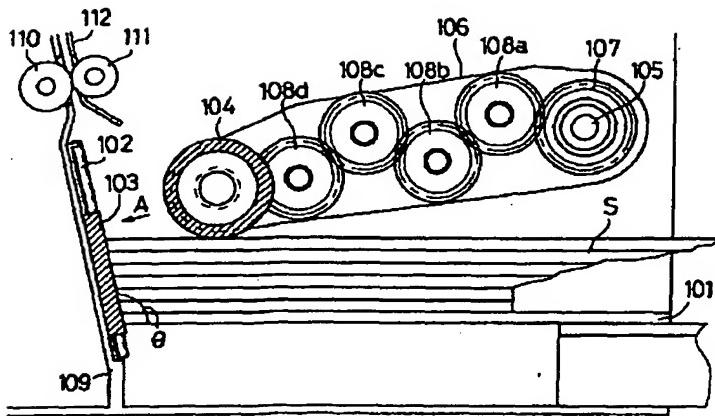
[Drawing 18]



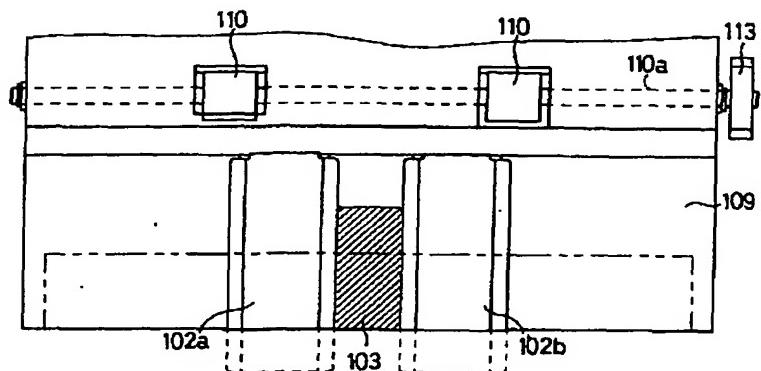
### [Drawing 20]



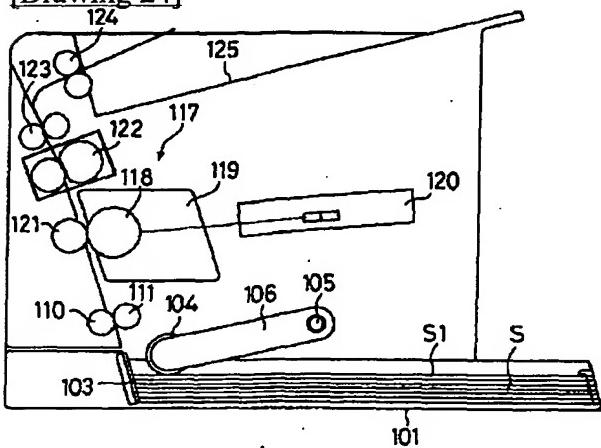
[Drawing 22]



[Drawing 23]



[Drawing 24]



[Translation done.]